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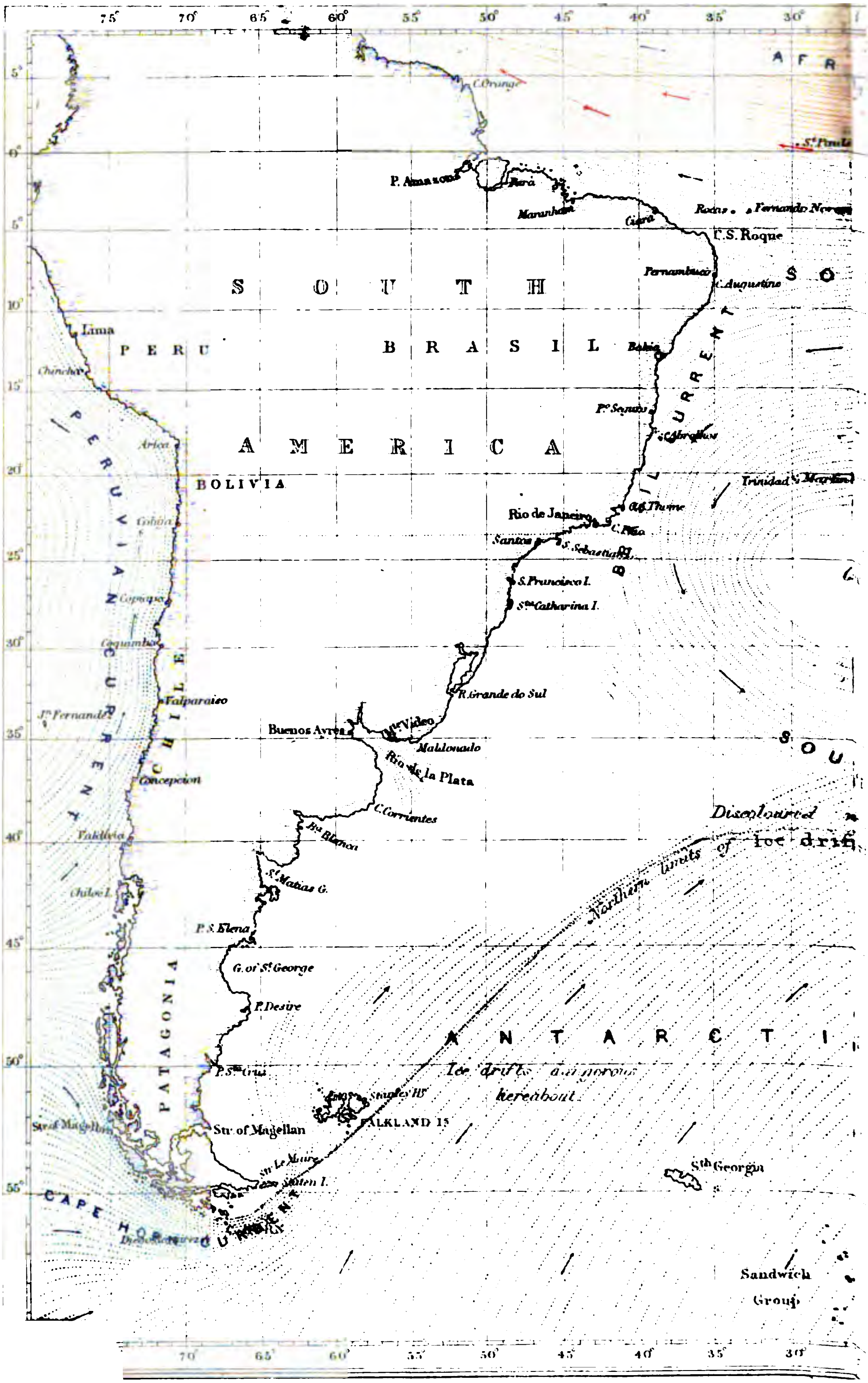
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R. Grande do Sul
Buenos Ayres
M. Video
Maldonado
Rio de la Plata
C. Corrientes
B.a Blanca
S.t Matias G.
P. S. Elena
G. of S.t George
P. Desire
P. S.ta Cruz
PATAGONIA
Discoloured
Northern limits of Ice drift
S O U
A N T A R C T I
Ice drifts dangerous hereabout
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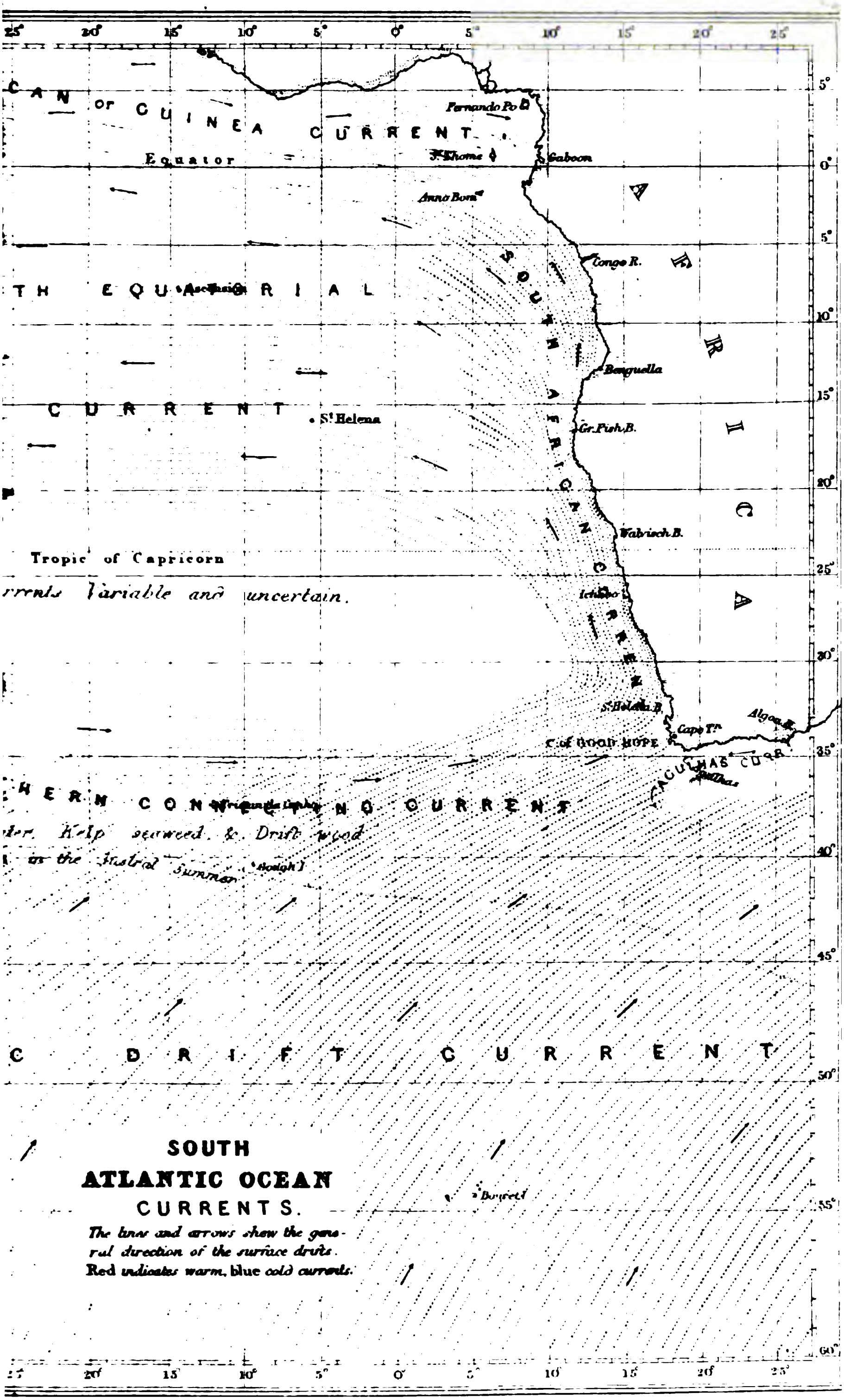

SOUTH
ATLANTIC OCEAN
CURRENTS.

The lines and arrows shew the general direction of the surface drifts.
Red *indicates warm*, blue *cold currents*.

A

SAILING DIRECTORY

FOR

THE ETHIOPIC

OR

SOUTH ATLANTIC OCEAN

INCLUDING THE

COASTS OF SOUTH AMERICA
AND AFRICA.

FIFTH EDITION.

BY ALEXANDER G. FINDLAY,

Fellow of the Royal Geographical Society.

LONDON:
PUBLISHED FOR RICHARD HOLMES LAURIE,
53, FLEET STREET, E.C.
1867.

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PREFACE.

This Nautical Directory for the South Atlantic Ocean may be considered as a continuation or supplement to our volume on the North Atlantic. Arranged on the same plan, and embracing the same topics, much of the generalization on its meteorology and its application to the seaman's use, is common to both. But in the latter volume much has been dilated on which has not been thought necessary to repeat here, further than was necessary to make this book complete in itself.

The early editions of this work bore the respected name of John Purdy as their author; but since his death, nearly a quarter of a century since, hydrography has so changed its requirements, that it has been necessary to remodel the whole, and rewrite almost every page. Thus the present, the fifth edition, bears but little resemblance to its earlier predecessors, and it may be considered therefore as a new work rather than an amplification of an old one.

It is true that there has been no systematic survey of either of the shores of South America or Africa within the period above named; but so numerous have been the additions to our knowledge, acquired from such a variety of sources, that it may be said that the descriptions which follow are a series of notes, added to the slight and imperfect, though so far exact, surveys of the French and English hydrographers of earlier times. For all this the present editor is responsible, and it is trusted that no authentic source of information has been overlooked.

To enumerate here the authorities on which the work is based, would be to give a very long list of obligations, which, as they are quoted throughout its pages, would be needless. It is sufficient here to express that obligation.

In many points our nautical knowledge of the South Atlantic is very inferior to what we know of the Northern part of the great ocean. But then its meteorology is much more simple, and its commerce vastly inferior. We know but little of its depth, or of the exact limits of its wind and current systems. But what is known is generally sufficient to ensure the best being made of their aid to navigation.

It is hoped that the varied information as to these subjects, and the descriptions of its coasts, ports, and islands, although they differ in value, will make this work an acceptable guide to the sailor.

A. G. FINDLAY.

London, September 20th, 1867.

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Note.—*At the end of the Volume will be found a copious Index arranged alphabetically.*

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LIGHTHOUSES, 1867.

EXPLANATION OF THE TABLES.

NAME AND CHARACTER OF LIGHT—FIRST COLUMN.

The principal coast lights are given in capitals. Secondary lights in smaller capitals. Tide lights in italics, &c.

GEOGRAPHICAL POSITION—SECOND COLUMN.

The latitudes and longitudes here given are presumed to be accurate, within less than 1'.

DESCRIPTION OF THE LIGHT, &c.—THIRD COLUMN.

In this, any peculiarity of the light, or period of a Tide light, is noticed; and also the direction of the double lights, &c.

DESCRIPTION OF APPARATUS—FOURTH COLUMN.

In this, the signs used to indicate the sort of light apparatus in use in each case:—

● signifies a catoptric, or reflector light.

1 a, 2, 3 d, &c., indicate dioptric, or lens lights, the figure showing the order or size. 1st, 2nd, 3rd, to sixth order.
a, a fixed lenticular light.
b, a revolving lenticular light.
c, a fixed and flashing light.
d, a holophotal light.

These figures and letters will serve to explain the peculiarities of the Lenticular System, as in operation therein, and described in the book of "Lighthouses of the World," published by Mr. R. H. Laurie.

HEIGHT ABOVE HIGH WATER—FIFTH COLUMN.

This gives the height of the *flame* in feet above the highest tide level.

VISIBLE IN MILES—SIXTH COLUMN.

This gives the minimum distance to which the light can be seen, in clear weather, from height of 10 feet above the sea level.

YEAR ESTABLISHED—SEVENTH COLUMN.

Name and Character of Light.	Lat. N. Long. W. ° ′	Description, &c.	Description of Apparatus	Height above H.W.	Visible in Miles.	Year Established.
GUAYANA.						
CAYENNE One fixed bright light One fixed *green* light One *red* light on jetty	4 56.2 52 14.8	Bright light N. of Fort Ceperou; *green* light on Infantry Barracks; in one S.E. by E.	.. ..	130 60	10 8	1863
SALUT ISLETS One fixed bright light	......	On the Hospital, Royale It.....	..	200	18	1864
ENFANT PERDU ROCK One fixed bright light	......	6 miles N. ½ W. of Cayenne....	..	33	10	1864
SURINAM LIGHT VESSEL One fixed bright light	6 4. 55 9.5	(Dutch.) 4 miles up from Bram's Pt., near 2nd buoy	..	30	10	1858 1862
BERBICE HARBOUR LIGHT-VESSEL One fixed bright light	6 19.3 57 22.3	(British). Near E. point of entrance	..	..	15	1850
DEMERARA (British)						
LIGHT-VESSEL One bright fixed lt.	6 55.5 58 1.5	In 3½ fathoms, 10 miles N.N.E. ½ E. from River entrance	●	..	12	1844 1864
DEMERARA RIVER One br. rev. lt., 1 m.	6 49.3 58 11.5	On East side of entrance. Red and white tower 100 ft. high	..	103	16	1829 1864

Name and Character of Light.	Lat. N. Long. W. ° ′	Description, &c.	Description of Apparatus	Height above H.W.	Visible in Miles.	Year Established.
TIERRA FIRME Orinoco River Lt.-Vessel	8 37. 60 42.	Sunk in 1859. Not likely to be replaced	..	..	..	....
PUERTO CABELLO One rev. lt. 40 secs.	10 30. 68 0.	Square tower on Brava Point; *red* and bright flashes........	..	79	14	1864
Tucacas One fixed bright light	10 47. 68 24.	(Venezuelan). Brava Point ..	..	30	9	....
BUEN AYRE One fixed bright light	12 2.5 68 22.5	(Dutch). Lacre Point, S. Point	●	85	12	....
Little Curaçoa Island One fixed *red* light	11 58. 68 44.	(Dutch). On S. side..........	●	62	10	1850
Great Curaçoa Island One fixed bright light	12 6. 68 59.	(Dutch). St. Ann Harbour, on Rif Fort	..	..	..	1850
Rio de la Hacha	......	*Light discontinued,* 1861.........	..	..	..	....
Limon, or Navy Bay, One fixed bright light	9 23.8 79 53.	(New Granada). N.W. part of Manzanillo Island	..	60	10	1852
HALF-MOON KAY One fixed bright light	17 12.3 87 32.4	(British). On S.E. Point......	..	88	18	1848
Bokel Cay One fixed bright light	17 8.3 87 56.5	On the Cay	5a	..	..	1863
Belize Three fixed bright lts.	17 19.6 88 4.	(British). Two on S. side, on Eng. Cay. One on Ft. George	.. 6a	95	3	1846 1863
Turneff Kays Three fixed bright lts.	17 36. 87 46.	(British). Fixed triangularly, on Mauger Kay, N.W. Point....	..	95 75	13	1846
GULF OF MEXICO						
Sisal One fixed bright light	21 10. 90 3.	(Mexican). On the Castle	..	60	10	1852
XICALANGO One br. rev. lt. ½ min.	18 37.8 91 54.8	Round white tower on W. side of entr. to Laguna di Terminos (Lt. on Carmen Island discon.)	2b	100	14	186
Coatzacoalcos River One fixed bright light	18 12. 94 17.	(Mexican). [Temporary light is shown while lighthouse is building, 1861.]	..	..	..	....
VERA CRUZ One rev. bright light	19 12.3 96 7.2	(Mexican). Fort San Juan de Ulloa	..	80	15	....
TAMPICO One fixed bright light	22 16.7 97 47.	Tower on North point of entrance	..	..	15	1865

Name and Character of Light.	Lat. S. Long. W. ° ′	Description, &c.	Description of Apparatus	Height above H.W.	Visible in Miles.	Year Established.
BRAZIL.						
PARA One rev. bright light	0 34. 47 17.1	On Atalaia Point..............	..	..	17	185
ITACOLOMI One rev. light, 2 min.	2 10. 44 24.	Tower, 75 ft. high, on the Point. Red and bright alternately ..	..	147	15	....
MARANHAM One fixed bright light	2 29.5 44 16.	San Luiz, on San Marcos Fort..	..	..	10	182
Alcantara Pt.	......	A fixed light for the anchorage	..	..	..	186
SANT' ANNA One rev. br. lt., 80 secs.	2 16.5 43 38.4	Square white tower, 80 feet high, rebuilt 1861	1b	70	14	1861
Ciara One fixed bright light	3 41. 38 29.	Macoripe Point	..	37	10	184
Gonzalo R. Lt. Vessel	......	One fixed light off entrance	..	..	..	....
RIO GRANDE DO NORTE One fixed bright light	5 45. 35 13.2	On Fortress, off Santos Reis Magos	..	43	12	186
Marca	......	Fixed light on the Cape........	..	..	..	....
PERNAMBUCO One rev. br. & *red* lt., 1 min.	8 3.7 34 51.7	On the Reef, 50 yards from Picao Fort. Twice brigut, and once *red*...............	..	..	22	182
MACEIO One fixed and flash. lt.	9 39.3 35 41.4	W. part of Mountain. Flash every 2 min.................	..	208	22	185
Cotinguiba Bar One fixed light	11 1. 37 4.8	Watch tower; light *red* to E., white to S.E., *green* to S.	..	11	1	186
BAHIA, or S. SALVADOR One rev. lt., 1½ min.	13 0.9 38 31.7	On Fort San Antonio. Twice bright, and once *red*	..	140	18	182
Fort do Mar	......	*Red* harbour light	..	..	..	186
MORRO DE S. PAOLO One rev. br. lt., 1 min.	13 21.7 38 54.8	On the Morro	..	276	20	185
Bojuru	......	Fixed harbour light	..	..	..	186
Christovao Perceira	......	Fixed harb. light on Point	..	..	..	186
Barba Negra	......	Fixed light on the Id.	..	..	..	186
Portalegre	......	Fixed light	..	..	..	...
ABROLHOS IDS. One rev. br. lt., 1 min.	17 57.7 38 41.5	On Santa Barbara	1b	189	17	186
CAPE FRIO One rev. br. lt., 1½ min.	23 1.1 41 58.	On Focinho de Cabo, ¾ m. S. of old Lighthouse	●	522	25	186
RAZA One rev. lt., 2¼ min.	23 5.7 43 8.3	Red tower, 50 feet high, on the Island. Br. & *red* alternately	..	315	14	182
RIO DE JANEIRO One fix. br. & 1 *red* lt.	22 56.6 43 7.3	Br. lt., on Ft. Sta. Cruz, E. entr. *Red* lt. on Calhabouco Pt....	..	..	6	18 18
SANTOS One fixed bright light	24 2. 46 3.	White tower, 40 feet high, on Moela Island	..	100	12	18
RIO GRANDE One rev. br. lt., 2 min.	32 7.3 52 4.4	1 1-10 mile from N. Point of entrance	..	96	14	18
ST. CATHERINE One rev. br. lt., ½ min.	27 49. 48 42.7	On Pta. dos Naufragados South bar of St. Catherine	2b	149	18	18

Name and Character of Light.	Lat. S. Long. W. ° ′	Description, &c.	Description of Apparatus	Height above H. W.	Visible in Miles.	Year Established.
RIO DE PLATA						
MALDONADO BAY One fixed bright lt.	34 58. 54 56.	(Banda Oriental.) Tower, 90 ft. high, on E. point	a	152	10	1860
FLORES One rev. br. lt., 3 m.	34 57. 55 55.8	(Banda Oriental.) White tower, 65 feet high (bad light)......	..	104	12	1833
English Bank Lt.-V. One fixed bright lt.	35 6. 55 54.	(Banda Oriental.) In 7 fathoms, on N. part	..	..	10	1857
MONTE VIDEO One fix. and flash. lt.	34 53.3 56 14.7	(Banda Oriental.) 1. On Mt., W. side of Harb., flash every 3 m.	..	486	25	1852
One fixed bright lt		2. On Cathedral tower, for anchorage....................	..	..	..	1864
Monte Video Lt. Ves. One bright fixed light	......	Against the Panela Reef in the Rio de la Plata..............	..	18	6	1866
Ortiz Bank Lt. Vessel One fixed bright lt.	35 11.5 57 1.3	(Buenos Ayrean). In 3¾ fms., 8 m. N.E. ½ N. from Indio Pt.	●	30	10	1857
Chico Bank Lt. Ves. One fixed bright lt.	34 47. 57 29.2	(Banda Oriental). In 5 fms., 13 m. N.E. ¾ N. from Atalaia Pt.	..	20	9	1857
Colonia One rev. br. lt., 3 m.	34 28.2 57 49.7	(Banda Oriental). On S.W. Angle of Plaza....................	..	110	10	1855
Buenos Ayres Gd. Ship One fixed bright lt.	34 34.5 58 16.	(Buenos Ayrean). In 2½ fms., in outer Roads	..	20	7	1857

PATAGONIA.

Name and Character of Light.	Lat. S. Long. W. ° ′	Description, &c.	Description of Apparatus	Height above H. W.	Visible in Miles.	Year Established.
FALKLAND ISLANDS One fixed bright light	51 40.7 57 41.8	(British). White and red striped tower, 60 ft. high, on C. Pembroke	●	110	14	1855

Name and Character of Light.	Lat. N. Long. W. ° ′	Description, &c.	Description of Apparatus	Height above H. W.	Visible in Miles.	Year established.
Senegal One fixed bright light	16 0.8 16 31.	(French). Ile de St. Louis	..	..	6	....
Almadie Point One fixed *red* light	14 45.1 17 32.1	On western rise of point 2 miles N.W. ½ W. from C. Verde Lt.	4a	85	8	186
CAPE VERDE One br. rev. lt. ½ min.	14 48.3 17 32.4	A white tower, 65 feet high	..	380	..	186
Cape Manuel One fixed *red* light	14 38.9 17 28.5	On W. pt. of Goree Bay, 6 miles S.S.E. from Cape Verde Light	4a	170	8	186
Gorée Island One fixed bright light	14 39.9 17 24.8	(French). In the Fort	..	..	6	...
RIVER GAMBIA						
Cape St. Mary One bright fixed lt.	13 30. 16 41.	On the flagstaff of Cape House..	..	70	10	186
Barra Point One fixed *red* light	......	On the flagstaff on Fort Bullen	..	35	6	186
SIERRA LEONE One fixed bright light	8 30. 13 18.5	(British). White tower, 69 feet high, on the Cape. Green lt. at landing place	..	96	18	184
MONROVIA One fixed bright light	6 19. 10 50.	(Liberian). Red tower, 40 feet high, on Cape Mesurado	..	240	15	185
CAPE PALMAS One fixed bright light	4 22.1 7 44.3	(Liberian). Tower, 50 ft. high, on the Cape	..	110	13	...
CAPE COAST CASTLE One fixed bright light	5 6.3 1 13.9	(British). White tower, 46 feet high, in Fort William	..	192	20	184
Fernando Po One bright fixed light	3 45.6 8 47.0	On Fernanda (or William) Point, N.E. extremity of Isabel Bay	..	..	5	18

THE SOUTH ATLANTIC OCEAN.

⁂ THROUGHOUT THIS WORK THE GIVEN LONGITUDE IS THE LONGITUDE FROM GREENWICH, AND THE MILES GEOGRAPHIC OF 60 TO 1°. IN THE SAILING DIRECTIONS THE BEARINGS AND COURSES ARE THOSE BY COMPASS, UNLESS WHERE OTHERWISE EXPRESSED; BUT THOSE GIVEN THUS [*W.S.W.*] SIGNIFY THE TRUE; AND THE GIVEN DIRECTION OF WIND, TIDE, AND CURRENT, IS GENERALLY TO BE CONSIDERED AS THE TRUE.

SECTION I.

THE ETHIOPIC or SOUTH ATLANTIC OCEAN is separated by the Equator from the North Atlantic. It presents a remarkable contrast to that sea in the absence of ports caused by the straight and unbroken coasts which limit it, and also in from not having any such archipelagoes as are met with North of the Equator. Besides this, a large portion of the coasts lying within the southern tropics, and the absolutely barren nature of its eastern side, render the commerce of this vast area of water of very small importance compared with other seas of equal magnitude. But it has no dangers in the great highways of shipping, and its navigation is simple and safe. As has been shown in our former volume on the North Atlantic, all the meteorological difficulties are met with in North latitude, and therefore the Southern Ocean has a complete system of winds and currents of its own, readily understood and easily applied to navigation.

As an evidence of the different nature of the South to that of the North Atlantic, the length of their respective coast lines will conclusively indicate this wide distinction. The North Atlantic coast line (without the smaller islands) amounts to a total length, measured round its chief sinuosities, of 59,400 miles, while that of the South Atlantic does not exceed 9,320 miles—not a sixth part of the former. This length of coast is made up as follows:—

Brasil North Coast	1400 miles
Brasil East Coast	2850
Uruguay	400
Buenos Ayres	750

Patagonia	1130 miles
Tierra del Fuego	510
Total American coasts	6540
Total African coasts	2780
Or together	9320 miles.

It will be unnecessary to state here upon what bases our exact knowledge of this ocean and its phenomena rests; they will be recited in the course of the work. The book is arranged on the same plan as that of the accompanying volume on the Northern Atlantic.

The name of the ETHIOPIC OCEAN has been proposed for this portion of the Atlantic, as it has in reality but few features in common with the North Atlantic, though continuous with it; but this has never come into general use.

The limits of these oceans as defined by the Committee of the Royal Geographical Society in 1845, are as follows:—

"The limits of Arctic and Antarctic Oceans, respectively to be the Arctic and Antarctic Circles; that the limits of the Atlantic on the North and South be the Arctic and Antarctic Circles; that its western limit be the coast of America, as far South as Cape Horn, and thence prolonged on the meridian of that cape, until it meets the Antarctic Circle; that its eastern limit be the shores of Europe, and Africa as far South as the Cape of Good Hope, and thence prolonged on the meridian of Cape Lagulhas, till that meridian cuts the Antarctic Circle."

The assumed division between the two oceans being the mathematical Equator, has one inconvenience, inasmuch as the meteorological and strictly geographical divisions occur to the northward. The separation between the wind and current systems of the two hemispheres may be taken as somewhere between 5° and 10° N. lat., while the African and American Continents approaching each other nearest between Sierra Leone and the N.E. part of Brasil about Cape San Roque, a distance of less than 1600 miles, it follows that the Guinea coast is rather included in the southern portion than belonging to the North Atlantic, and this is also found to hold good with regard to its peculiar meteorology.

On this account the description of the African Coast is included in this volume, rather than in that devoted to the North Atlantic Ocean.

The first portion of this work embraces the geographical positions of its various points accompanied by such notes as may be deemed necessary for their elucidation. But this is the less necessary of late years, by reason of perfection of those official observations, which preclude the hope of any private and isolated operations such as can only be carried on in an ordinary merchant ship, being made available for their improvement, or the detection of any discrepancies.

The second portion of the book deals with the winds, currents, tides, and other influences on its navigation, which portion is followed by the necessary instructions for traversing it in various directions: and the final chapters contain ample descriptions of its islands, coasts, and harbours.

POSITIONS OF PLACES, ETC.

I. ISLANDS AND SHOALS.

⁂ *The* FIGURES *in Brackets refer to the* NOTES *subjoined to each Section.*

	Latitude.	Long. W.	Var. 1866.
VOLCANIC REGION [1]	° ′ ″	° ′ ″	
Crown Reef, 1835	0 57 0 S.	23 19 0	
Le Pacifique Shoal (shock), 1771	0 42 0	22 47 0	
Cæsar Breakers, 1730	2 0 0 N.	22 18 0	
Volcano (Lieutenant Evans), 1824	7 0 0	21 50 0	
Warley Shoal, 1813	5 4 23	21 25 40	
Bell's Shoal (shocks), 1842	1 7 0 S.	21 21 0	
La Seine Bank, 1832	0 22 0	21 15 0	
Aquila Reef, 1831	0 22 15	21 6 30	
La Silhouette Shoal (shock), 1754	0 20 0	20 50 0	
Krusenstern's Volcano, 1806	2 43 0	20 35 0	
French Shoal, 1796 ?	4 5 0 N.	20 35 0	
Ferguson's Shoal (shock)	1 35 0 S.	20 27 0	
Philanthrope Shoal (shocks), 1836	0 40 0	20 10 0	
Rackham's Shoal (shocks), 1842	0 26 0	19 58 0	
French Shoal	4 15 0 N.	19 20 0	
Bouvet's Sandy Island, 1761	0 23 0 S.	19 10 0	
Circassian Bank, 1841	0 1 0	19 0 0	
Short's Volcano (shocks), 1852	3 30 0	24 30 0	
La Fidèle (shocks), 1758	0 20 0	18 0 0	
Triton Shoal, 1816	0 32 0	17 46 0	
Le Prince Shoal (shocks), 1747	1 35 0	17 15 0	
Henry Tanner Reef (vol. ashes), 1836	0 35 0	15 50 0	
Marie, 1853	0 12 0	19 0 0	
Prince (shock), 1853	0 54 0 N.	26 56 0	
Florence Nightingale (shock), 1859	0 44 0	29 20 0	
Passodnick (shock), 1859	0 29 0	28 30 0	
Sea Serpent (shock), 1859	0 29 0	28 30 0	
Dallas (shock), 1861	0 27 0	20 30 0	
Melbourne (shock), 1861	0 20 0	20 35 0	
Eleanor (shock), 1861	0 44 0	21 19 0	
Peñedo de San Pedro, or St. Paul's Islets, summit	0 55 30 N.	29 22 45	13° 40′ W.
FERNANDO NORONHA; the pyramid	3 50 10 S.	32 24 50	11° 15′ W.
The ROCAS, centre of South Sand Id. [2]	3 51 25	33 48 57	10° 24′ W.
Shoal of Manoel Luis	0 52 10	44 13 0	
Isle of Trinidad [3]	20 31 0	29 18 58	10° 30′ W.
Martin Vas Rocks, the largest	20 27 40	28 52 45	
Hotspur Bank, the N.W. extreme	17 51 30	36 5 9	7° 0′ W.
Victoria Bank	20 45 8	37 47 33	5° 0′ W.

ISLANDS AND SHOALS—CONTINUED.

	Lat. S.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
Islands, etc.—continued.			
Pilot Bank	21 45 0	39 50 0	
Medeiros Rock	25 41 0	44 47 0	
Laurel Shoal, off the Plata *about*	36 28 0	51 30 0	
Ascension, the Barrack Square	7 55 48	14 25 18	21° 0′ W.
St. Helena, the Observatory [4]	15 55 26	5 42 30	24° 20′ W.
Grant Breakers ? *about*	31 33 0	11 30 0	
Tristan da Cunha, N.W, point	37 24 8	12 18 39	
Inaccessible Island, centre	37 19 0	12 23 0	
Gough's Island (Diego Alvarez)	40 19 30	9 46 0	
Lennon's Reef *about*	37 31 0	4 42 0	
Robson Reef	37 35 0	7 30 0E.	
Marion Rock [5]			
Bouvet, or Circumcision Island, the centre	54 16 0	6 14 0	
Montezuma Rock (1843)	29 32 0	39 30 0W	
Ariel Rocks ?	40 0 0	57 37 0	
FALKLAND ISLANDS [6]			
Port Louis, Govt. House at Anson	51 32 0	58 7 30	17° 0′ E.
Berkeley Sound, entrance	51 35 0	57 50 15	
Port William Lighthouse	51 39 14	57 48 43	
Cape Pembroke, Lighthouse	51 40 40	57 41 48	16° 0′ E.
Port Harriet, entrance	51 44 0	57 50 15	
Port FitzRoy, entrance	51 47 0	58 2 15	
Port Pleasant	51 48 55	58 11 41	
Choiseul Sound, Pyramid Point	52 1 20	58 36 15	
Lively Island, S.E. extreme	52 6 15	58 25 17	
Point Porpoise, Bay of Harbours	52 21 47	59 19 37	
Beauchene Island, South extreme [7]	52 51 30	59 12 15	
Mintey Rock *about*	52 54 0	59 17 15	
Sea Lion Isles, W. extreme	52 26 50	59 9 52	
George Island, S.W. Cliff	52 24 0	59 48 27	
Speedwell or Eagle Island, Jack's Harbour	52 13 0	59 41 31	17° 30′ E.
Elephant Kays	52 9 0	59 53 7	
Grantham Sound	51 35 30	59 13 15	
Sussex Harbour, entrance	51 39 0	59 3 15	
Port San Carlos, centre	51 30 0	59 5 15	
Fanning Head	51 28 6	59 8 50	
Cape Dolphin	51 14 35	58 58 45	
Eddystone Rock	51 11 30	59 3 30	
Port San Salvador	51 27 5	58 20 19	
Cape Carysfort	51 25 40	57 51 15	
Volunteer Point	51 31 15	57 43 55	
Uranie Rock	51 31 45	57 41 15	
Eagle Point	51 32 50	57 47 15	18° 0′ E.
Port Egmont, Ruins of Settlement	51 21 26	60 4 19	
Saunders' Island, N.W. summit	51 17 20	60 20 5	
Keppel Island, N.W. Cliff	51 18 45	60 3 15	
Cape Tamar, N. Cliff summit	51 16 50	59 30 5	
Tamar Harbour, Eastern Head	51 20 32	59 25 57	
White Rock Point	51 24 23	59 12 37	

ISLANDS AND SHOALS—Continued.

	Lat. S.			Long. W.			Var. 1866.
	°	′	″	°	′	″	
Falkland Islands—continued.							
White Rock Harbour, S. Head	51	26	25	59	13	15	
Many Branch Harbour, N. point	51	31	5	59	20	45	
Port Howard, entrance................	51	36	30	59	32	15	
Shag Harbour	51	43	30	59	38	15	
Fox Bay, E. entrance	52	0	5	60	1	7	
Port Edgar, S. head	52	2	10	60	15	25	
Port Albemarle, N. head	52	11	40	60	21	15	
Albemarle Rock.....................	52	14	33	60	24	57	
Cape Meredith	52	16	15	60	39	22	
Port Stephens, E. entrance point	52	11	50	60	42	42	18° 3′ E.
Bird Island.........................	52	10	45	60	55	27	
Rodney Bluff	52	3	36	61	4	52	
Cape Orford	51	59	45	61	6	37	
Cape Split	51	49	20	61	20	52	
New Island, highest summit	51	42	7	61	18	7	
Coffin or Ship Harbour................	51	43	10	61	17	22	
Passages Island, summit	51	34	55	60	47	3	
Split Island, W. summit	51	28	5	60	42	25	
West Point Island, W. bluff	51	23	0	60	43	27	
Jason Isles, W. Kay	51	0	38	61	81	17	18° 20′ E.
Steeple Jason, summit	51	4	0	61	9	52	
Hope Point, Hope Harbour............	51	20	51	60	40	29	
Sedge Island, N.W. extreme	51	10	30	60	27	45	
Port Egmont Kay....................	51	13	5	63	9	25	
Pottinger's Bank	54	36	0	67	49	0	
Shag Rocks	53	48	0	43	25	0	
ISLE of GEORGIA, or SOUTH GEORGIA.							
Willis Island	54	0	0	38	23	0	6° 30′ E.
Adventure Bay, the head of	54	2	48	38	8	4	
Cape North ....[8]	54	4	45	38	15	0	
Cooper's Island	54	57	0	36	4	20	
Cape George	54	17	0	36	22	30	
Clerke's Rocks	55	5	30	34	42	0	4° 20′ E.
SANDWICH LANDS.							
Traverse Islands, Volcano	55	57	0	26	33	0	No Var.
Candlemas Isles ....[9]	57	10	0	27	13	0	
Cape Montague	58	33	0	26	46	0	
Southern Thulè	59	34	0	27	45	0	
Morrell's Western Point	59	35	10	27	42	30	
SOUTH SHETLANDS, &c. [10]							
Adelaide Island, W. point	67	14	0	68	26	0	
Mount William, Graham's Land	64	45	0	63	51	0	
Cape Possession..........................	63	26	0	64	6	0	

tudes depend upon that of the flagstaff at the Government House at Port Louis (Anson), which was found to be, by repeated chronometric measurements, 12° 50′ 30″ East of Port Famine (70° 58′ 0″), the fundamental point of Captain King's operations, but which, from a different assumption of the longitude of Rio Janeiro, he places 3′ 52″ *eastward* of the position assigned to it in the Table.

The given longitudes of the Falkland Islands have heretofore been considered as an approximation only. The observations of the Spanish officers, in the *Descubierta* and *Atrevida*, 1793-4, assigned to Port Egmont lat. 51° 21′ 3″, long. 60° 6′; the latter, by chronometric difference from Cape Horn, assuming that Cape as in 67° 21′, instead of 67° 16′, the longitude shown in the Table. The true difference would, therefore, give 60° 10′. Lieutenant Edgar, on his survey of the Western Island, in 1786-7, allowed only 59° 42′, as the longitude of Port Egmont. This is much too far East.

The officers of the *Descubierta* made Port Louis, at the N.W. extremity of Berkeley Sound, 51° 34′ S., and 58° 5′ W. This, corrected by the true longitude of Cape Horn, will be 57° 51′.

Mr. Weddell, with very inferior means, but careful and repeated observations, made the longitudes of Port Louis, 58° 3′ 30″; Ship Harbour, New Island, 61° 9′; and West Point Harbour, 60° 36′ 30″. Here we embrace the opportunity of noticing that, in 1825, appeared Mr. Weddell's account of "A Voyage toward the South Pole, performed in the years 1822—24; containing an Examination of the Antarctic Sea, to the 74th degree of latitude, and a Visit to Tierra del Fuego, &c.;" a volume, as will be seen in the Directory, which has imparted valuable information on the several coasts which he visited. Mr. Weddell proceeded from London on a sealing voyage, in the *Jane*, of 160 tons, accompanied by the cutter *Beaufoy*, of 65 tons, which commenced 17th of September, 1822, and ended in 1824, after an absence from England of nearly two years; and it is to be remarked, that he proceeded to a higher southern latitude than any previous navigator; for on the 20th of February, 1823, he reached lat. 74° 15′, in long. 33° 20′ W., where the sea was clear, many whales in sight, and birds innumerable.

7. Beauchêne Island.—In Captain FitzRoy's Tables the position of this island appears to be given erroneously, it being there stated as in 52° 41′, and long. 59° 5′ (the South extreme), or 10′ 30″ North, and 5′ West of the place assigned to it on the Admiralty Chart, which is that given in the Table; and which, from the bearings given from fixed points in the Survey, we presume is correct.

8. South Georgia.—Adventure Bay, near the N.W. end of Georgia, and South of Cape North, is given as described by Captain Weddell. The other points are given from Captain Cook's Second Voyage, January, 1775.

9. Sandwich Lands.—The Candlemas Isles, Cape Montague, and Southern Thulé are given in the Table from Captain Cook's Second Voyage, January and February, 1775; but Captain Biscoe states that the longitudes are about 50′ to the West, which, we are apprehensive, requires confirmation.

10. South Shetlands.—The positions of these islands are generally unsatisfactory, with the exception of Deception Island, the station of Captain Foster's pendulum experiments. A chart, published by the Hydrographic Office, exhibits them much to the *eastward*, in some cases nearly to the amount of 2°. In these high latitudes it is, without doubt, a difficult task to fix meridional distances, or absolute positions, with that degree of accuracy that can be attained in lower latitudes and less rigorous climates. In the absence of more certain authorities, we have repeated the positions as given in the former edition.

II.—THE NORTHERN COAST OF BRASIL FROM CAPE SAN ROQUE, WESTWARD.

	Lat. S.	Long. W.	Var. 1866.
CAPE SAN ROQUE, extreme .... [2]	5° 28′ 18″	35° 17′ 30″	9° 40′ W.
Point Pititinga, the base	5 21 20	35 21 12	
Touro or Toiro Point, N.E. extreme of Brasil; the summit	5 9 0	35 30 10	
San Roque Shoals, N.E. extreme	5 26 15	35 13 30	
„ Pedra da Sioba, at N.W. end	5 2 20	35 24 25	
Urca do Cotia, or Caboclas Shoal, centre.	4 51 30	35 48 0	
Coroa das Lavadeiras Shoal, N.E. extrm.	4 52 10	35 51 20	9° 10′
Urca da Conceição Shoal, centre........	4 51 10	36 2 30	
Urca do Minhoto Shoal, centre	4 52 25	36 13 30	
Urca do Tubarao Shoal, centre	4 51 0	36 24 25	
Tubarao Point, North Down	5 2 40	36 25 40	8° 50′
Assu River, Bar....................	5 3 0	36 39 30	
„ Macáu Town..............	5 7 0	30 34 20	
Point do Mel, extreme	4 56 10	36 50 40	
Redonda Point, extreme	4 54 30	36 55 30	8° 40′
João da Cunha Shoal, N. extreme	4 44 0	36 56 20	
Rio Mossoro, E. point of entrance....[3]	4 57 30	37 6 40	
Morro Tibao	4 49 20	37 15 48	
Reteiro Pequeño, remarkable hummock..	4 48 16	37 7 10	
Reteiro Grande, hummock on the point..	4 36 20	37 30 53	
Morro of Aracati (*an inland hill*)	3 42 10	37 52 8	
Mouth of the Jaguaripe, red bluff and battery	4 23 30	37 47 7	
Point Macoripe ....[4]	3 41 50	38 28 49	
CIARA, otherwise Ceara, or Seara; steeple [5]	3 42 58	38 32 56	7° 50′
Hills of Ciara, or Seara; as seen on the meridian:			
1st summit	3 39 27	38 46 13	
2nd summit	3 46 22	38 46 46	
3rd summit.....................	3 50 24	38 41 13	
4th summit.....................	3 53 20	38 44 15	
5th summit.....................	3 58 0	38 39 13	
Morro of Opicem	3 33 30	38 47 17	
Curu, the village ....[6]	3 30 0	38 51 7	
Hummock on down of Parati	3 24 10	38 57 23	
Hummock, on Mandahu Point..........	3 10 0	39 15 30	
Morro, or Mount Melançia	3 11 40	39 17 29	
Pernambuquinho	3 1 50	39 35 26	
Rio dos Patos, the entrance...........	2 58 50	39 38 1	
Mount Meruoca, the summit	3 17 55	40 3 29	7° 10′ W.
Point of Jericoacoara, highest land	2 47 28	40 25 23	
Hummock near the shore.............	2 50 22	40 37 23	
Morro Ticondiba, the summit	3 10 37	40 34 43	
Rio Camucim, or Camosin, hummock at the entrance	2 50 0	40 42 58	
Mount Tapuya; the Western summit ..	2 58 25	40 48 37	
Rio Tapuya, entrance	2 50 25	40 48 18	
Rio Iguarassu, entrance, East point	2 52 27	41 16 10	

THE NORTHERN COAST OF BRASIL—CONTINUED.

	Lat. S.	Long. W.	Var. 1866.
Hummock on a sandy isle	2° 48′ 57″	41° 40′ 49″	
Entrance of a River, *Tutoya* or *Tutoia?* [7]	2 41 13	42 10 9	
Rio das Perguiças, or Perjuizas; Eastern point	2 41 27	42 25 9	5° 50′ W.
Lançoes Grandes; Eastern point	2 26 12	42 57 59	
Hummock in the Lançoes Grandes	2 24 12	43 3 25	
Another Hummock in the same	2 23 22	43 7 6	
Morro Alegre	2 20 17	43 11 12	
St. Anna's Breakers; Eastern point	2 12 38	43 31 51	
St. Anna's Lighthouse (*a square tower; light revolving* [8]	2 16 18	43 43 41	5° 10′ W.
Breakers of the Coroã Grande:			
Middle of the Northern	2 10 50	43 59 53	
——— N.W.	2 13 15	44 6 18	
——— West	2 17 0	44 7 28	
Maranham Island; white down on the North side	2 24 36	44 6 30	
Fort St. Marcos, flagstaff	2 28 22	44 18 15	
Fort St. Antonio das Areias, flagstaff	2 29 24	44 19 8	
St. Luiz de Maranham; steeple of the Cathedral [9]	2 30 44	44 18 21	4° 40′ W.
Point de Bom Fim; house	2 30 42	44 19 18	
Point de Guia; red house	2 30 43	44 20 53	
Point Ataki, or Taqui; Western extrem.	2 33 4	44 22 44	
Rock, East of the Isle Medo	2 30 19	44 21 37	
Alcantara, Western steeple	2 23 33	44 25 19	
Point Tatinga, or Alcantara; the cliff [10]	2 23 38	44 23 33	
Point Janauba, red cliffy shore	2 22 4	44 22 36	
Point Piraremo, middle of the cliff	2 19 26	44 21 45	
Mount Algre, the summit	2 17 16	44 22 17	
Point Carnaveros	2 12 7	44 23 13	
Monte Itacolomi, or Itacolumi; Lighthouse, *revolving light*	2 8 38	44 26 45	2° 0′ W.
Shoal of Manoel Luiz, Western rock	0 51 25	44 16 56	
Anchorage of La Bayadère, before the same	0 52 3	44 17 9	
Vigia, seen by M. Sylva	0 32 0	44 17 14	
St. Joao, or St. John's Island, N.E. extremity	1 14 30	44 53 57	
Cape Gurupi	0 54 5	46 11 3	
Point Atalaia; Lighthouse, *fixed light. with flash every two minutes*	0 33 5	47 16 47	
Point Tijioca	0 34 0	47 51 18	
Pará, Fort San Pedro	1 21 0	48 30 12	1° 15′ W.

NOTES.

1. NORTHERN BRASIL.—The Table of the Positions of Places between Cape St. Roque and Maranham is chiefly from that of M. Le Baron Roussin, Commander of the Hydrographic Expedition made by order of the French Govern-

ment; and it was gratifying to find that the results, generally, are so accordant with those previously gained by Captain Hewett in 1814.

But the portion between Cape San Roque and the Rio Mossoro, is from the the survey made by order of the Imperial Government of Brasil, in 1857-9, under Lieut. A. Vital de Oliveira. The positions of this survey accord, generally, with those of the Baron Roussin. The space between Maranham and Para is from the survey by Captain M. L. Tardy de Montravel. But it may be generally stated that the charts of the coast are not so complete as could be desired. This will be further alluded to in the subsequent pages.

For the position of Point Macoripe and other points, observations were made by the late Captain Hewett, when a lieutenant in H.M. frigate *Inconstant*, and the results were first published by this gentleman in 1817. The latitudes were derived from meridional observations made on the spot, and the longitudes by two excellent chronometers from Rio Janeiro.

Until the appearance of Captain Hewett's chart, constructed at the expense of the proprietors of this work, there was not one chart of the North Coast of Brasil that could, in any degree, be relied on. As to longitude, a chart published in London, as a *new one*, in 1808, represented Maranham *nearly* 2° *too far to the West*,—a most dangerous error, considering the nature of the coast, in the months of August, September, October, and November deemed inaccessible, from the thick haze which hangs over the land at that season of the year. Captain Hewett gave the following points:—

	LATITUDE.			LONGITUDE.		
	°	′	″	°	′	″
Point Macoripe, near Ciara, or Seara......	3	40	30 S.	38	27	0 W.
St. Anna's Island	2	18	0 —	43	43	0 —
Mount Itacolomi (*the mark for Maranham*)	2	8	0 —	44	24	0 —
Middle Bank, Maranham; North end :...	2	17	0 —	44	10	30 —
St. Marcos Point, Maranham	2	28	0 —	44	15	0 —

2. CAPE SAN ROQUE, with its dangerous offlying shoals have been first correctly represented in Lieut. Oliveira's charts. For the reason before assigned, this has become of much greater importance of late years, although the advisability of vessels always coming within their dangerous vicinity in sailing southwards is still an open question, as will be seen hereafter.

3. RIO MOSSORO is the western limit of the Brasilian survey.

4. POINT MACORIPE.—In 1830, Captain George Cheveley, of Liverpool, made the latitude of the inner anchorage off Ceara 3° 43′, and Point Macoripe 3° 40′, with longitude some minutes eastward of that in the Table: but Captain the Hon. Wm. Wellesley, in H.M.S. *Sapphire*, at anchor in 5½ fathoms, with the flagstaff on the fort S. 34° W., made the latitude of the point 3° 38′ only, and its longitude 38° 30′ E., confirming that given in the Table.

5. CEARA.—Roussin places Ceara 3° 42′ 8″ East of Pernambuco; Lartigue makes the difference 3° 39′ 58″; mean of the two, 3° 41′ 3″; this makes the longitude of Ceara 38° 32′ 56″. M. Lartigue makes Ciara 5° 47′ 11″ East of Maranham, or 38° 31′ 9′. We have given the first result, which is confirmed exactly by Captain Mouchez.

6. CURU.—The village of Curu was visited and described by the Hon. Captain Wellesley, as shown hereafter. Its position is given by Captain W. as 3° 28′ S., and 39° W.; but according to the Baron Roussin' chart it stands in 3° 30′, and 38° 53′.

7.—TUTOYA, or TUTOIA.—The entrance to the Port of Tutoyah is given in the Table as represented by the Baron Roussin; but we are inclined to think that this must be the entrance of a small river, the *Jaca*, about 7 leagues more to the westward. In the charts generally, that of the Baron Roussin not excepted, this portion of the coast has been very inaccurately represented. See the description hereafter.

8. ST. ANNA' LIGHTHOUSE.—Captain Wellesley gives the lighthouse on St. Anna's

Island as in lat. 2° 15′ 10″, and 43° 40′ 18″, observing that it is not on the northernmost point of the island, and that the effulgence of the light is brighest once in every forty seconds; but this will be found described with the sailing directions.

***Fort St. Antonio*, near Maranham, was given by the same gentleman as in 2° 29′ S. and 44° 20′ W.**

9. Maranham.—Capt. Sabine's position of the Cathedral of Maranham, as quoted by Commodore Owen, is lat. 2° 31′ 42″, long. 44° 18′ 30″; but the longitude originally given, from Captain Sabine's observations, in his own volume, is 44° 21′ 18″. With the reason of this difference we are not acquainted. The observations were made at the house of the British Consul, adjoining the cathedral; so that the longitude may be referred to that structure, without sensible error. The longitude was the result of 158 lunar distances (16 sets) taken in the months of August and September, 1822, in conjunction with several chronometric differences, &c. The Baron Roussin places it in 44° 16′ 2″, reckoning from Anhatomirim, upon which all his longitudes depend (*Pilote du Brésil,* page 13); but as we have placed Anhatomirim 6′ 54″ *eastward* of his position, this will only give 44° 9′ 8″. Although this dètermination accords with the observations of Sir E. Home (44° 8′ 7″), still, in measuring westward, great discrepancies will be found, which may be obviated by referring to other observations.

Captain Hewett, as above, places St. Marcos Point (6′ East of the Cathedral) in 44° 15′; but as his longitude of Rat Island, Rio Janeiro, is 3′ 15″ East of our position, it will make it 44° 18′ 21″ (Cathedral 44° 18′ 21″), precisely the result obtained by Captain Forster by his run from Fernando Noronha, July, 1831; and as this will also nearly coincide with the measurement from Para, we have given this longitude in the Table.

10. Maranham to Para.—The late indefatigable Capt. C. Philippe de Kerhallet, of the Imperial French Navy, drew up some instructions for this portion of the coast in 1841, but the survey by Lieutenant afterwards Captain Hewett, R.N., was the chief basis of the chart. This survey was, in some degree, amended by that made by Capt. Tardy de Montravel, by order of the French Government in 1840, the results of which are given hereafter.

III.—EASTERN COAST OF BRASIL.

	Lat. S.	Long. W.	Var. 1866.
Cape San Roque, summit ....[1]	5 28 18	35 17 30	9° 40′ W.
Rio Ceara-mirim, S. point of entrance ..	5 41 15	35 16 0	
Rio Grande, Fort dos 3 Reis; *light*	5 45 5	35 14 50	
————, Natal; town	5 47 40	35 16 20	
Ponta Negra, extremity	5 53 20	35 12 10	
Cotovello, pt. North of	6 0 12	35 9 45	
Rio Camoropim, mouth	6 7 38	35 8 35	
Point Pipa, North end	6 13 30	35 5 30	
Rio Cunhahu, N. point of entrance......	6 19 15	35 4 0	9° 35W.
Formosa, N.W. part	6 23 20	35 3 0	
Rio Guaju, entrance	6 30 40	34 56 40	
Bahia da Traiçao, S.E. point	6 42 35	34 53 5	
Rio Mamanguapé, N. point	6 45 32	34 52 0	
Point Lucena, extrance................	6 53 50	34 48 15	
Rio de Parahiba, Fort on Point Matto or Balea	6 57 10	34 47 35	
Parahiba, church	7 7 0	34 50 35	

EASTERN COAST OF BRASIL—CONTINUED.

	Latitude.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
Cape Branco, cliff	7 8 30	34 45 50	
Nossa Senhora da Penha	7 9 30	34 46 0	
Jacumam, village	7 16 0	34 45 0	
Petimbu, church	7 23 12	34 44 25	
Rio de Goiana, Point Guagiru	7 28 18	34 44 30	9° 37′ W.
Point das Pedras, extreme	7 35 35	34 43 12	
Funil Point, hill	7 37 50	34 45 34	
Itamaraca Island, Fort on S.E. point	7 47 5	34 47 20	
Ma. Farinha	7 49 0	34 47 35	
OLINDA, Western tower	8 1 0	34 50 46	
PERNAMBUCO, Fort Picao; *rev. light.*	8 3 30	34 51 48	9° 25′
———, Recife; tower [2]	8 4 7	34 22 42	
———, Boa Vista; tower	8 3 36	34 53 0	
Freguezia de Sant' Antonio	8 8 8	34 51 33	
Freguezia das Affogados	8 6 16	34 51 40	
Candeia, church	8 12 6	34 51 42	
San Gonzalo, Chapel on the downs	8 17 20	34 52 45	
Cape San Agostinho, Church on summit	8 20 25	34 52 20	
Cupé, extreme of point	8 26 20	34 53 55	
Monte Sellada, S. peak 13½ miles inland	8 24 30	35 7 5	
Maracahype, village	8 32 0	34 55 35	
Santo Aleixo, S. point of E. islet	8 36 0	34 55 35	9° 19′
Rio Formosa, Chapel at entrance	8 39 0	34 58 35	
Tamandaré, Fort to South	8 43 32	35 0 0	
Rio Una, mouth	8 50 0	35 3 15	
San Bento, Church	9 5 0	35 2 25	
Port de Piedras, anchorage	9 10 0	35 16 0	
Rio Camaragibe, estancia	9 20 15	35 21 0	
Tabuda, anchorage off	9 27 40	35 25 15	
Point Verde, extreme	9 35 20	35 34 35	
Maceio, *lighthouse* (flashing lt. 2 min.)	9 39 55	35 36 30	2° 48′
Porto Francez, village	9 45 0	35 41 25	
Rio de San Miguel, village on S. point	9 50 40	35 45 20	
Jiquia, E. end of village	10 2 30	35 54 35	
Coruripe, S. extreme of point	10 10 0	36 1 15	
Japu, bank 7 feet	10 18 0	36 4 35	
Péba, extreme of point	10 20 0	36 10 30	
Rio de San Francisco, N. point [3]	10 28 50	36 17 15	8° 15′
———, S. point	10 29 15	36 18 0	
Mountains of Itabayanna, summit	10 47 10	37 23 3	
Rio Vasa Barris, the Bar	11 11 0	37 17 2	
Os Tres Irmaõs, or the Three Brothers	11 15 37	37 10 9	
Rio Real, South point	11 28 4	37 20 24	
Tower of Garcia da Vila	12 32 26	38 0 54	
Rio Jacuipe, entrance	12 41 52	38 7 39	
Abrantes, signal mast on the South	12 51 32	38 16 50	7° 15′
Itapuan, the signal mast	12 57 3	38 21 39	
Rock of Itapuan	12 57 58	38 21 50	
Itapuanzinho, the point	13 0 59	38 28 6	
———, the flagstaff	13 1 3	38 29 13	
BAHIA; the Lighthouse on Fort St. Antonio [3]	13 0 45	38 31 45	6° 20′ W.
Nossa Senhora de Bom Fim, the steeple	12 55 40	38 30 19	

EASTERN COAST OF BRASIL—Continued.

	Lat. S.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
Nossa Senhora de Mont-Serate, the steeple	12 55 58	28 31 0	
Piton of the Isle dos Frades	12 49 28	38 37 56	
Morro of St. Amaro, in Itaporica	13 1 8	38 45 26	
Knoll of Conceiçaō	13 2 33	38 41 19	
Point Jaburu, in Itaporica	12 57 36	38 35 52	
Nossa Senhora da Penha	12 59 16	38 36 35	
Point Aratuba	13 5 7	38 44 23	
Point Caixo-Pregos	13 7 33	38 46 32	
Morro of San Paulo; *lighthouse*, revolving light 1 minute	13 22 35	38 54 19	6° 0′ W.
Hill W.N.W. from the same	13 19 27	39 0 16	
Isle Boypeda, one of the summits	13 37 43	38 56 46	
Isle Quiepé, Port Camamu	13 50 58	38 58 50	
Villa de Contas	14 18 6	39 0 13	
Os Ilheos, the largest rock	14 46 0	39 1 5	
Town of San Jorge dos Ilheos	14 49 25	39 0 8	
Village of Unha	14 59 7	38 5 43	
Morro of Commandatuba, the S.E. summ.	15 22 8	39 7 31	
Village of Commandatuba	15 25 20	38 56 20	
Town of Belmonte	15 51 4	38 54 11	
Santa Cruz, the steeple	16 18 50	39 1 47	
Porto Seguro, steeple of the Cathedral	16 26 50	39 3 4	5° 50′ W.
Nossa Senhosa da Judea, Chapel	16 29 25	39 13 20	
Monte Pascoal or Pascal, summit 1758 ft.	16 54 8	39 23 31	
Mount Joaō de Liam, the summit	17 0 26	39 36 28	
Mouth of the Rio Cramimuan	16 51 12	39 19 15	
Colombiana	17 6 1	39 11 44	
Villa Prado, flagstaff on the Fort	17 21 28	39 12 5	
Caravelhas, S. pt. of entrance (Mouchez)	17 43 36	39 10 24	
Port Alegre, entrance of the R. Mucury	18 4 15	40 17 34	
Paracel dos Paredes, N.E. point	17 56 45	38 53 0	
ABROLHOS ISLES, North-east Rk. [4]	17 57 27	38 41 36	
——————, Sta. Barbara, *lighthouse*	17 57 51	38 41 12	5° 30′ W.
Rio de San Matheo; North point	18 37 10	39 44 51	
Rio Doce, West point of the entrance	19 36 57	39 51 7	
Serra dos Reis Magos, Southern summit	19 50 27	40 21 54	
Morro Almeyda	19 57 20	40 19 25	
Mestre Alvaro, the summit	20 8 54	40 21 57	
O Tubaraō, rock near the Cape	20 16 23	40 16 1	
Cape Tubaraō, S.W. point	20 16 22	40 17 15	
Victoria, Piton to the North of the town	20 17 49	40 22 32	4° 15′ W.
Dangerous Rock in the Bay	20 18 32	40 17 32	
Cape Penedo, in the River	20 19 16	40 21 14	
Nossa Senhora da Penha, Church	20 19 34	30 19 46	
Rock Balea, in the entrance of the River	20 18 50	40 18 48	
Mount Moreno, the summit	20 19 23	40 19 11	
Pacotes Rocks, the largest	20 21 2	40 16 15	
Isle Jicu, the summit	20 23 9	40 20 16	
Isle Française, East point (Mouchez)	20 35 0	40 44 22	
Point Jicu, the summit	20 26 1	40 21 47	
Ilhas Razas (Low Isles), the middle	20 42 42	40 24 17	
Isle Calvada, the middle	20 44 8	40 26 54	

EASTERN COAST OF BRASIL—Continued.

	Lat. S.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
Guarapari, steeple on the South point of the Bay	20 43 56	40 32 28	
Morro Bo (an insulated mountain)	20 47 24	40 41 2	
Morro of Benevento, summit	20 55 21	40 49 10	
Serra de Guarapari, Western summit	20 50 15	41 8 3	
Serro do Pico, highest part	21 1 30	41 18 47	
Mount Campos, Southern summit	21 22 38	41 27 42	
Mountains of Furado, the highest	21 49 58	41 43 10	
Cape San Thomé, E. extreme (Mouchez)	22 2 0	40 58 28	3° 0′ W.
————, house on the beach to S.W.	22 3 0	41 2 58	
St. Anna's Isles, the largest	22 25 0	41 41 13	
Peak of Frade de Macahé	22 12 2	54 4 0	
Morro of San Joaõ, summit	22 32 26	42 1 10	
Isle Branca, or White Isle; summit	22 43 42	41 45 0	
Cape Busios, extremity	22 46 3	41 51 44	
Ancoras Isles, the Easternmost	22 46 26	41 45 48	
Papagayos Isles, the N.E. Isle	22 52 9	41 53 11	
Cape Frio, Northern summit [5]	22 59 55	41 57 24	2° 5′ W.
————, the new *lighthouse*	23 1 18	41 58 10	
Cape Negro, the point	22 57 10	42 40 33	
————, highest hill to the North	22 52 38	42 39 5	
Maricas, Southern Isle	23 0 53	42 55 32	
Raza, *Lighthouse*	23 4 17	43 9 20	
Redonda, or Round Isle; summit	23 4 45	43 11 43	
Nossa Senhora da Gloria, the steeple	22 54 42	43 10 13	
RIO JANEIRO, Sugar-loaf (1,292 feet) [6]	22 57 14	43 9 7	1° 0′ W.
————, Vilganhon flagstaff	22 53 31	43 8 55	
————, Isle Ratos, or Rat Isle	22 53 16	43 9 38	
————, Morro Corcovado (1,580 ft.)	22 56 13	43 12 41	
La Gabia, or Gavia	22 59 0	43 17 22	
Lagé de Marambaya, a flat rock	23 7 47	43 51 57	
Morro of Marambaya, summit (700 feet)	23 5 9	44 2 58	
Isle of Jorge Grego, S.W. point	23 15 11	44 14 6	
O Papagaio, summit of the large Isle	23 10 55	44 15 47	
Point Acaya on Ilha Grande	23 15 12	44 24 52	
Point Joatinga, summit of the Islet	23 18 30	44 33 26	
Hill of Cairoçu, Eastern summit	23 20 2	44 37 43	
Peak of Parati, summit	23 19 28	44 48 28	
Isle Couves, the largest	23 25 54	44 52 18	
Ponta Grossa	23 28 15	45 1 44	
Isle Vittoria, summit	23 47 42	45 8 14	
Busios Isles, the S.E. Isle	23 44 27	45 0 28	No Var.
Ilhas dos Porcos, Southern hillock	23 33 38	45 4 42	
Islet Mar-Virado, summit	23 34 7	45 8 44	
Ponta das Ostres, extremity	23 34 52	45 11 48	
Villa Bella da Princesa, the steeple	23 46 52	45 21 21	
Point Pirasonungo, on St. Sebastian's	23 57 32	45 14 57	
Point Septuba, on the same	23 57 32	45 14 57	
Montaõ de Trigo, or the Corn-stack	23 51 4	45 46 26	
Alcatrasses, the largest	24 6 5	45 41 11	
Santos, the Arsenal	23 55 51	46 19 49	1° 0′ E.
——, summit of the Moela	24 3 6	46 16 31	

EASTERN COAST OF BRASIL—CONTINUED.

	Lat. S.	Long. W.	Var. 1866.
Point Taypu, at the entrance of Santos..	24° 1′ 11″	46° 24′ 59″	
Lagé de Santos	24 18 0	46 10 10	
Redonda, or Little Queimada	24 21 26	46 49 11	
Queimada Grande	24 28 21	46 41 14	
Mount Cardoz	24 58 45	48 7 5	
CANANEA, Bom Abrigo I.	25 6 49	47 50 35	
Figueira Island, centre (160 feet)	25 21 29	48 2 34	
Isle do Mel, Southern summit..........	25 32 43	48 18 39	
PARANAGUA, Fort on the Bar ......[7]	25 30 14	48 18 54	2° 0′ E.
————, West point of Cotinga Isle .	25 29 50	48 28 34	
————, Church of Sta. Antonina ..	25 25 42	48 39 0	
Coral Rocks, the largest	25 45 49	48 23 4	
Itacolomi Rocks, the largest	25 50 20	48 25 38	
Morro Caiuva........................	25 49 30	48 34 22	
Point Joao Diaz, on the South side of the Rio S. Francisco ....[8]	26 10 15	48 32 25	
Tamborete Isles, Southern Isle	26 20 54	48 31 44	
Isles Remedios, Southern Isle	26 29 28	48 34 43	
Point Itapacoruya, North side..........	26 47 18	48 37 5	
Mount Zambo, on the continent	27 11 6	48 34 54	
Volage Bank, 14 fathoms..............	26 44 0	48 5 0	
ISLE OF ST. CATHARINE and OPPOSITE COAST ....[9]			
Arvoredo Isle, the summit	27 16 47	48 23 39	
The FORT STA. CRUZ D'ANHATOMIRIM [10]	27 25 32	48 33 58	2° 30′ E.
San Miguel, the Church (on the continent)	27 27 15	48 35 14	
Sant' Antonio, the Church (on the island)	27 30 17	48 28 11	
Town of NOSSA SENHORA do DESTERRO .	27 35 25	48 30 52	
San José, the Church (on the continent) .	27 36 18	48 35 2	
Le Ribeiraõ, the Church (on the island) .	27 42 18	48 32 11	
Enceada do Brito, the Church..........	27 46 15	48 36 42	
The Isle dos Cardos	27 48 38	48 33 29	
South Port, on the Isle of N-S da Conçeicaõ	27 50 9	48 19 11	
Islet Badejo	27 26 6	48 19 12	
Isle Aranhas, the largest	27 29 42	48 19 48	
Isle Xavier	27 37 18	48 22 0	
Isle Campexe	27 42 12	48 26 30	
Moleques do Sul, the largest	27 49 49	48 24 10	
Isles Tres Irmaos, Eastern Isle	27 50 10	48 27 45	
Point Catheta	27 35 34	48 23 36	
—— Grossa	27 48 18	48 28 12	
—— de Lagohina....................	27 46 18	48 28 13	
—— dos Frailes (Friars' Point)........	27 50 0	48 32 12	
—— dos Naufragados	27 49 47	48 32 55	
—— Pinheira	27 53 8	48 39 13	
Isle do Coral	27 55 10	48 30 49	
Cape Guaratuba......................	28 6 12	48 36 28	
—— Cirui	27 59 12	48 35 46	
—— Uvidor	28 12 24	48 36 28	

EASTERN COAST OF BRASIL—CONTINUED.

	Latitude.	Long. W.	Var. 1866.
Islet Tocoromi	28° 19′ 29″	48° 32′ 6″	
Point Viraquera	28 13 25	48 35 24	
Isle das Araras	28 18 0	48 33 8	
Point Bituba	28 16 5	48 35 6	
Isle Lobos de la Laguna	28 24 36	48 41 40	
Morro da Barra	28 29 18	48 46 28	
Town of Laguna	28 29 23	41 47 0	
Cape Sta. Marta Pequeno	28 38 32	48 47 16	
—— Sta. Marta Grande	28 39 0	48 43 32	3° 0′ E.
Barra Velha	28 51 30	49 12 45	
As Torres	29 28 0	49 56 20	
Praya a Fernambuco, Eastern part	29 52 0	49 55 36	
——— d'Estreito, Eastern part	31 12 0	50 36 36	
Rio Grande de S. Pedro, the Lighthouse	32 7 20	52 5 36	6° 20′ E.
Bank of Sand and Shells, Eastern part	33 44 0	52 28 14	
Los Castillos, the Eastern Rock, 100 feet	34 24 30	53 45 0	

NOTES.

1. The Eastern Coast of Brasil between Cape San Roque and the entrance to the Rio San Francisco, is given from the Brasilian survey by Lieut. Vital de Oliveira. The positions in this survey accord with sufficient accuracy with those of the previous, but less complete survey by the Baron Roussin.

The charts drawn up by that expedition, however, were not of that minute accuracy which a modern survey would require, though sufficient for the general purposes of commerce. This defect has been in a great measure supplied by the Imperial Brasilian Survey, before mentioned, which terminates at the Rio San Francisco.

Besides this important addition to our hydrographical knowledge, the Imperial French Government sent Captain E. Mouchez first in the steam-vessel *Bisson*, and afterwards in the steam-vessel *D'Entrecasteaux*, in 1861, with excellent chronometers, and that officer carried a chain of meridional distances between Para and the Rio de la Plata, basing these observations on the well determined meridian of Rio Janeiro. The longitudes, with but very few exceptions, as obtained by Captain Mouchez, are in exact accordance with those of Roussin, FitzRoy, Sabine, and others, as detailed in the previous editions of this work.

2. Pernambuco.—The position of this place does not seem open to dispute; to connect it with other places, we have taken Admiral FitzRoy's observations. The difference of longitude obtained by Admiral FitzRoy, between Fort St. Pedro, Bahia, and Fort Picaõ, is 3° 39′ 15″; which makes the latter in 34° 51′ 48″, which varies only 5′ from the position given from Admiral Roussin, and 7″ from Capt. Hewett's determination.

Captain Mouchez makes the longitude exactly the same, and Mr. Liais, the Brasilian astronomer, only makes a difference of 7″.

3. Bahia.—The lighthouse on Fort San Antonio is 42″ W. of Fort San Pedro, to the N.W. of it, and to which place Admiral FitzRoy has referred his measurements. By several runs between Rio and this place, he has made the difference of longitude

between them, as 4° 37′ 51″, 4° 37′ 54″, 4° 37′ 51″, and 4° 37′ 52.5″. The mean of these is 4° 37′ 52″, which, applied to the longitude of Vilganhon Island, and the difference of longitude between Fort San Pedro and the lighthouse, will place the latter in 38° 31′ 45″, as in the Table.

This point was examined with especial care by Adm. FitzRoy, who made the three passages between Rio and Bahia for its determination, with results identical in each case. It is satisfactory to state that the Brasilian astronomer, M. Liais, in his measurement differs only 18″ from the longitude in the Table.

The coast between Bahia and Rio de Janeiro was partially examined by Captain Mouchez, of the Imperial French Navy, in 1861. The longitudes differ considerably from those of the previous charts, especially between Sao Paulo and the Ilheos, a portion which was not closely exaamined before. It is necessary therefore to be on guard when nearing this part of the coast.

4. Abrolhos.—The difference of longitude between Sta. Barbara and Rio Janeiro, according to Admiral Roussin, is 4° 32′ 22″, while Admiral FitzRoy, with 22 chronometers, by repeated measurement, makes it 4° 27′ 15″. As Admiral FitzRoy's attention was particularly directed to this difference, we take his measurement, which will place this in longitude 38° 41′ 40″.

Captain Mouchez made six passages between Rio and the Abrolhos; the results combined with Admiral FitzRoy's, make the longitude 38° 41′ 12″, as in the Table. The latitude, by many circum-meridian altitudes of the sun, is 17° 57′ 51″, according to Captain Mouchez.

6. Cape Frio.—The Baron Roussin gives the position of the South point of the Cape as in lat. 23° 1′ 18″, long. 42° 3′ 12″; but Lieut. H. Kellett, who surveyed the harbour in 1831, has given the summit of the Island in lat. 22° 59′ 54, long. 1° 9′ 6″ East of Rio. This gives for the longitude 41° 49′ 59″ from Greenwich, from the reasons given in the next Note, on Rio Janeiro. Sir Thomas Brisbane and Mr. Rumker, in 1821, obtained the Cape Point as 41° 57′ W. In 1824, Captain Livingston made the latitude of the Saddle Gap, on the middle of the island, by a good meridian altitude, 23° 1′ 2″ S. Captain Forster makes it 1° 10′ 45″ East of Vilganhon Island, which will give for its position 41° 58′ 10″, as in the Table.

The old lighthouse stands on the highest point of the island, the *new lighthouse* is on Focinho do Cabo, on the S.E. point, or 51″ East of the former. Captain Mouchez, who took some pains to determine its longitude, because it was believed that it was placed 4 or 5 miles too far West, makes it in longitude 41° 58′ 35″, by combining his own with the preceding observations. The light is revolving bright light, visible every 1½ minute, elevated 522 feet, seen 25 miles off.

7. Rio Janeiro, &c.—In 1832 were published, under the authority of the Lords of the Admiralty, "Sailing Directions for the coast of Eastern and Western Patagonia, &c., including the sea coast of Tierra del Fuego; being the result of a voyage performed in His Majesty's sloops *Adventure* and *Beagle*, between the years 1826 and 1830, under the direction of Captain Philip Parker King, F.R.S., &c.;" and, in 1836, appeared in the Journal of the Royal Geographical Society, a "Sketch of the Surveying Voyages of H.M.S. *Adventure* and *Beagle*, commanded by Captains P. P. King, P. Stokes, and Robert FitzRoy, R.N."

Captain King's first observations on this expedition were given in the first volume of the same Journal, 1831, which detailed the operations of the two ships until their return to England, in 1830.

In the autumn of this year the *Beagle*, commanded by Admiral FitzRoy, was again prepared for a continuation of the survey, and every care and assistance was given for her equipment. At the end of 1831 she sailed from Plymouth; from which time, until 1835, she was surveying the coasts of South America, the Falkland and the Galapagos Islands. Traversing the Pacific Ocean by the way of Taheite and

New Zealand, she proceeded to visit Sydney, Hobart Town, King George's Sound, the Keeling Islands, the Maritius, the Cape of Good Hope, St. Helena, Ascension, Bahia, Pernambuco, the Cape Verde Islands, and the Azores. Meridian distances, the principal object, were carefully measured during the whole voyage. Observations for latitude, and the variation and dip of the needle, for the intensity of the magnetic influence, and upon tides, were made at each principal port. *This connected chain of good meridian distances is the first that has been carried around the world.* From 14 to 22 chronometers were employed, and the results are highly interesting. "On this expedition no life was lost, nor any serious injury sustained by any individual. Not a spar was sprung, except studding sail booms, nor a sail split till worn too long, nor a single sheet of copper lost from the vessel's bottom. The *Beagle* was so well fitted out at Plymouth dockyard, and afterward so supplied by direction of the Admiralty, that neither want nor deficiency ever occurred. Some of the officers and men served more than ten years in this vessel, having shared all the disagreeables of the former voyage to Tierra del Fuego, from 1826 to 1830."

Captain King, in the introduction to his Sailing Directions, has stated that "The eastern coast of Patagonia, the western part of the Strait of Magalhaen, the Gulf of Peñas, and other parts of the western coast, were surveyed by Captain Stokes, of the *Beagle*. Upon the death of that officer, Admiral FitzRoy succeeded to the command, and discovered and examined the Otway and Skyring waters, and surveyed the outer or sea coast of Tierra del Fuego, from Cape Pillar, at the western entrance of the Strait of Magalhaen, to Cape St. Diego, on Strait Le Maire.

"The differences of meridians, between the various points of the survey, were fixed in all practical cases, by triangulation; but where this mode could not be adopted, they were ascertained by chronometric observations; the zero point (0) being the place of the Observatory at Port Famine (lat. 53° 38′ 12″ S.) the longitude of which was fixed at 70° 54′ West of Greenwich.

"This determination was obtained principally by chronometers from Monte Video and Rio Janeiro, which agreed very closely with the mean result of a considerable number of lunar distances observed at Rio, Gorriti, Monte Video, San Carlos de Chiloe, and Valparariso; and severally referred to Port Famine by the chronometric chain. Assuming *Villegagnon* (Vilganhon) *Island* at Rio de Janeiro to be 43° 5′ 3″ West of Greenwich, which is the result obtained by us with 14 chronometers from Plymouth, the longitude of Rat Island at Monte Video will be 56° 9′ 30″: and of Port Famine, 70° 54′ 1″. The mean of the lunar observations above mentioned make the latter 70° 54′ 10″, whence the zero point of the survey has been fixed, as above stated, at 70° 54′. Should the longitude of the station at Rio Janeiro, at some future time, be more correctly determined, all the meridional differences of this survey must be corrected by a quantity equal to the excess or defect of what it is here assumed to be."

After the publication of Captain King's operations, the fine work of Admiral Fitz Roy, or rather the joint production of Captain King, Admiral FitzRoy, and Mr. Darwin, the naturalist to the latter expedition, appeared, and from which we have derived much information embodied in the following pages.

In the Appendix to our work on the North Atlantic Ocean will be found the remarks of Admiral FitzRoy upon his chronometric measurements, "forming a connected chain of meridian distances around the globe, the first that has ever been completed or even attempted by means of chronometers alone." It will be there seen, that this chain exceeds the entire circumference of the earth by about 33 seconds of time, equal to 8′ 15″ of longitude. How this excess may affect the position of Rio Janeiro, as given by Admiral FitzRoy, we have not considered; and although the longitude we have taken is still greater than Admiral FitzRoy's, we may here say, that it is not at all unlikely that it is more to the eastward, or nearer the position assigned to it by Captain King, or as given in the former edition of this work.

In estimating the longitude of Rio Janeiro, we have brought into the calculation most of the observations that have been made, many of which would seem to be perfectly satisfactory, and yet vary from each other to a very considerable extent; yet it would seem unjust to throw them out altogether from the computation; and we have therefore thought that the best mode of procedure would be to give them entire, and, from their combined result, give the longitude. This result will coincide with that assumed by Lieutenant Raper in his valuable work, and also with that of Admiral FitzRoy; the same conclusion being arrived at by different means. We shall now give the grounds upon which the longitude in the Table has been taken. The difference between them amounts to 12′ or 14′; Roussin placing it in 43° 15′; Heywood in 43° 2′, and the British officers in 1810, as 43° 0′ only.

Admiral FitzRoy, with 22 chronometers, has given the longitude of Vilganhon Island as 43° 8′ 45″, and this result is probably very near the truth.

Lieutenant Raper has assumed the longitude of this place, from Captain Beechey's observations of moon-culminating stars at Anhatomirim, as 43° 8′ 50″ or 43° 9′, as a secondary meridian, which very nearly agrees with the determination of Admiral FitzRoy as above.

Upon comparing the longitudes, as found by astronomical observations, or the *absolute* position, and those obtained by the chronometer, or the *relative* position, we shall find that they very nearly coincide with that given by Admiral FitzRoy.

Now, the differences of longitude between the principal points on this coast seem to be tolerably well ascertained, and therefore it is not necessary, in fixing the position of Rio, to confine ourselves to those observations made there exclusively; we shall, therefore, first give the various longitudes as obtained by independent observation.

Captain Hewett made the longitude of Rat Island, from 11 sets of lunations (5 East and 6 West, 43° 6′ 23″. Rat Island is 43″ eastward of Vilganhon flagstaff, to which place we shall refer the measurements; this gives for the latter 43° 5′ 40″. Sir Thomas Brisbane's and Mr. Rumker's three results in August, 1821, were 43° 3′ 0″ (53° 2′ 17″), 43° 1′ 0″, (43° 0′ 17″), and 43° 10′ 15″ (43° 9′ 32″). The Portuguese astronomer, Don B. S. Dorta, by an eclipse of the sun, 1784, February, made it 43° 16′ 43″. The same eclipse, as calculated by M. Wurm, 43° 11′ 25″. Captain King made Vilganhon Island, by lunars, in 43° 8′ 18″; and Captain Stokes, by the same means, 43° 9′. M. Wurm subsequently gave the longitude from three occultations as 43° 16′ 40″, and by the eclipse above mentioned, 43° 10′ 55″; and from Dorta's observations, 43° 15′ 10″. Admiral Roussin, from the mean of 892 lunar distances divided into 332 series, deduces the longitude of the Sugar Loaf to 43° 14′ 20″, or Vilganhon, 43° 14′ 50″. Captain Otto Von Kotzebue, in November, 1823, from repeated observations on land, made Botafogo in long. 43° 7′ 32″ (Vilganhon, 1′ 50″ East, or 43° 5′ 42″); M. Simonov makes it 43° 7′ 17″; and Lieutenant Wainwright makes it 43° 10′ 39″. Captain Beechey calculated it by moon-culminating stars as 43° 4′ 41″, and by 158 lunars as 43° 10′ 41″; and an occultation, calculated by Faskanoff, gives it as 43° 14′ 0″.

Besides the longitudes that have been observed at Rio, there are others which may be brought into the calculation, and among these is that of *Fort Anhatomirim*, near the N.W. point of the Island of St. Catharina. Lieutenant Raper deduces his longitude of Rio from the observations of Captain Beechey, in 1836, for fixing the position of this place: they consisted of series of moon-culminating stars, 6 observations, 1st limb, from 3^{h} 14′ 15″ to 3^{h} 14′ 29″; and 5 observations, 2nd limb, from 3^{h} 13′ 36″ to 3^{h} 14′ 34″. These observations, computed by Mr. Henderson, give 48° 33′ 54″, and another set gave 48° 34′ 47″. The difference of longitude between Anhatomirim and Vilganhon, the mean of several measurements, is 5° 25′ 3″ (see Note 11): this will give for the first computation, 43° 8′ 51″, and for the second, 43° 9′ 44″, for the longitude of Vilganhon. The longitude of Anhatomirim, by Givry and Duperrey (lunar), is 48° 40′ 47″ (Vilganhon, 43° 15′ 44″), M. Givry, on the 17th of May, 1820, at Anhatomirim, observed an immersion of Jupiter's first satellite, from which the longitude of Vilganhon may be taken 43° 12′ 30″. The longitude of *Monte Video*, by the transit of Mercury, 1789, calculated by Wurm and Triesneker, is 56° 11′ 11″; and M. Ferrer, by lunars, makes it 56° 14′ 14″; the difference of longitude between Vilganhon and Monte Video, from a mean of five measurements, is 13° 4′ 37″, which makes the former, by the first observation, in 43° 6′ 24″, and by the second, 43° 9′ 27″.

The mean of these 24 independent observations is 43° 9′ 34.1″.

At the head of those who have made *chronometric* measurements for fixing the longitudes of Rio Janeiro may be placed Admiral FitzRoy, who, with 22 chronometers, made Vilganhon Fort in 43° 8′ 45″, as before mentioned. Captain P. P. King had made it 43° 5′ 3″. Captain Owen, in H.M.S. *Leven*, in 1822, by his run from Porto Praya, St. Iago, makes the longitude of Rat Island 43° 14′ 30″ (Vilganhon, 43° 13′ 47″). Captain Foster, with 17 chronometers, made Vilganhon in 43° 5′ 41″; or, according to Dr. Tiarks, 43° 8′ 12″. Captain Heywood, by his runs from St. Helena, makes Vilganhon in 43° 2′ 50″, and 43° 1′ 58″. M. Mackan, in the *Clorinde*, in 1821, makes it in 43° 14′ 2″. Admiral Roussin, by one chronometer, makes it 43° 13′ 56″.

The mean of these chronometric results is 43° 8′ 15″; and the mean of the chronometrical with the astronomical observations, as given above, will be 43° 8′ 5″: this longitude is only 10″ more than Admiral FitzRoy's, and is 5″ less than that assumed by Lieutenant Raper.

In the foregoing remarks, the observations have been reduced to Vilganhon, although many of them were determined at different points; and it will be seen that the French authorities have hitherto placed it as much to the *westward* as Captain King and others have given it to the eastward of this position. As most of the longitudes on this coast are referred to Rio Janeiro, it is of the utmost importance that this should be definitely determined.

We have before stated, that Lieutenant Raper makes Vilganhon Island in 43° 8′ 50″ (5″ more than Admiral FitzRoy's determination), and finally assumes it as 43° 9′ 0″, which is 5″ less than the conclusion which is to be arrived at from the foregoing observations. Lieutenant Raper's position is deduced from Captain Beechey's moon-culminating stars at Anhatomirim; while the same observer, by the same means, at Rio, makes it only 43° 4′ 41″.

The later assumptions of the longitde of Rio Janeiro place is somewhat more to the eastward, or Vilganhon, in 43° 6′ 30″ E. To this it may be said that if such refined appliances, such vast labour, and great talent, being devoted to this problem, and with such varying results, the means at the command of a ship not specially fitted out for such operations, cannot be hoped to determine with greater certainty what has employed so much attention.

(8.) PARANAGUA.—On September 7th, 1858, the great total solar eclipse was observed here by M. Liars, of the French Imperial Observatory, and a numerous staff of scientific assistants. From the elaborate calculations resulting from this important work, the place of observation was determined to be in lat. 25° 30′ 33″ S., long. 48° 29′ 25″, but we have no notice of the exact spot. Therefore the positions of Capt. King and Admiral FitzRoy are retained.

(9.) RIO SAN FRANCISCO.—The position is that assigned by Captain Mouchez, which is the result of two measurements in the *Bisson* and the *D'Entrecasteaux*. The longitude is identical with that of Roussin, but the latitude of the latter is 4 miles in error.

10. ST. CATHARINE'S TO BUENOS AYRES, &c.—M. Barral, on a re-survey of the Rio de la Plata, and a portion of the coast between it and St. Catharine's, assumed for his first meridian of departure, that of the Cathedral of Monte Video, taking it as 56° 13′ 4″, which he considered as perfectly settled by the observations of General Varela, by mean of the passage of Mercury over the Sun's disc, on the 5th of De-

cember, 1789, and the calculations of Messrs. Triesneker and Ferrer. The differences in longitude were thence gained by 4 chronometers.

Captain Heywood, in H.M.S. *Nereus*, with accurate chronometers, made five runs between *Rat Isle*, in Rio Janeiro, and *Monte Video*, as follows:—13° 2′ 0″, 13° 5′ 12″, 13° 4′ 17″, 13° 1′ 4″, and 13° 3′ 9″, = mean, 13° 3′ 12″. Hence 43° 8′ 12″ (*Rat Island*) + 13° 3′ 12″ = 56° 11′ 24″, the longitude of the Lighthouse on the Mount, which is 1′ 35″ to the westward of Rat Island. Its latitude, according to M. Barral, is 34° 53′ 2″. Captain King has given it as 34° 53′ 2″.

The Spanish Survey of the River Plata gives the longitude of the Lighthouse as 56° 16′. On the contrary, the British officers on this station, in 1810, assigned to it the longitude of 56° 2′ and 56° 3′ only.

The meridional difference between *Monte Video* and the Cathedral of *Buenos Ayres* is about 2° 8′ 45″. The British officers make it 2° 10″; the Spanish, 2° 7′ 30″. Its latitude is 34° 36′.

The Cathedral of Monte Video, on the authority quoted by Captain Owen, in his Tables, is in long. 56° 20′ 36″; which we conclude is 7′ or 8′ too far to the West.

Again, adverting to St. Catharine's, the difference of Messrs. Roussin and Barral in the longitudes of Anhatomirim, &c., is 5′ 58″, the greater being that of M. Roussin.

11. ANHATOMIRIM.—The difference of longitude between Fort Sta. Cruz of Anhatomirim, and Vilganhon Island at Rio Janeiro, according to the Baron Roussin, is 5° 26′ 20″; and by another measurement, 5° 25′ 9″. Admiral FitzRoy made it 5° 25′ 45″; Captain Beechey, 5° 23′ 31″; Captain King, 5° 24′ 37″; Captain Foster, 5° 24′ 42″; and M. Givry, 5° 24′ 59″. The mean of these is 5° 25′ 3″, which, added to the longitude of Vilganhon, makes 48° 23′ 58″.

Captain Beechey's observations place it in 48° 33′ 54″; and by another computation, 48° 34′ 47″; mean, 48° 34′ 20″; which differs 25″ from Admiral FitzRoy's chronometric result.

The longitudes of the coast, between St. Catharine and the River Plata, have been adjusted by the preceding data.

IV.—RIO DE LA PLATA TO CAPE HORN.

	Lat. S.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
NORTH SIDE OF THE PLATA.			
CAPE STA. MARIA, OR ROCHA..........	34 39 1	54 9 8	8° 38′ E.
Isle of Lobos, centre.................	35 0 51	54 52 11	
TOWN OF MALDONADO, the Tower......	34 53 27	54 57 10	
Isle Gorriti, Well at N.E. end..........	34 57 2	54 58 8	
Ballena Point	34 53 44	55 2 10	
Punta Negra, or Black Point	34 53 1	55 18 0	
——— d'Afilar	34 47 15	55 28 31	
Punta das Piedras Negras de Sta. Rosa	34 46 30	55 42 31	
Isle of Flores; Light tower on S.W. end	34 56 19	55 56 10	
MONTE VIDEO, the Cathedral	34 54 37	56 11 37	9° 7′ E.

RIO DE LA PLATA TO CAPE HORN—CONTINUED.

	Lat. S.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
NORTH SIDE OF THE PLATA—cont.			
Isle Ratos, Monte Video ....(1)	34 53 21	56 13 32	
Hill and Lighthouse of Monte Video....	34 53 21	56 15 6	
Point Espinillo	34 49 50	56 24 32	
The Panela Reef	34 54 45	56 24 37	
Sta. Maria, or S. Gregorio Point........	34 41 5	56 48 0	
Point Rosario........................	34 26 0	57 19 0	
Punta del Sauce......................	34 25 21	57 24 58	
Colonia del Sacramento, Lighthouse	34 28 14	57 49 14	
SOUTH SIDE OF THE PLATA.			
CAPE SAN ANTONIO, North extremity..	36 18 30	56 46 8	10° 5′ E.
Rio Salado, entrance	35 43 15	57 19 32	
Hillock of Juan Jeronimo	35 29 15	57 19 7	
Point Piedras of San Borombon	35 26 50	57 5 28	
Hillock Salvador Grande..............	35 19 10	57 8 23	
Point del Indio	35 15 20	57 10 19	
First Ombu Tree of the Magdalena	35 2 45	57 28 49	
Magdalena, the Church	35 2 14	57 31 19	
Atalaya Point, watch tower	34 54 56	57 42 45	
Punta de Santiago	34 50 16	57 54 42	
Ensenada de Barragan, fort on S. side of entrance......................	34 49 30	58 56 10	
BUENOS AYRES, Mandeville House .	34 36 18	58 22 44	10° 33′ E.
———— Landing Place, mole..	34 35 30	58 22 10	
Medanos Point, S,E. summit	36 59 5	56 41 2	10° 25′ E.
Mar Chiquito, Bar of	36 37 0	57 22 4	
Cape Corrientes, East summit..........	38 5 30	57 29 34	
Mount Ventana.....................	38 11 45	61 56 37	
Point Hermeneg	38 22 40	57 52 4	11° 20′ E.
Black Point, Cliff summit	38 39 0	58 47 49	
Fort Argentina	38 43 50	62 15 0	
Mount Hermoso.....................	38 50 50	61 40 4	
Labyrinth Head, summit	39 26 30	62 2 55	13° 5′ E.
Colorado River, mouth................	39 51 40	62 4 39	
Rubia Point, S. Blas Bay, summit......	40 36 10	62 8 59	
Carmen, Fort........................	40 48 15	62 58 25	
Rasa Point	40 52 10	62 18 34	
Negro River, Main Point	41 2 0	62 45 29	
Direction Hill, summit	40 48 0	65 10 29	
Belem Bluff, S.W. cliff.............	41 9 0	63 55 49	
Bermeja Head, East summit	41 11 0	63 7 49	14° 50′ E.
San Antonio Sierra, summt............	41 41 10	65 12 29	
Norte Point	42 3 0	63 48 0	
Port San José, Pt. S. Quiroga..........	42 14 15	64 27 29	15° 40′ E.
Port Valdes, entranne	42 30 25	63 35 39	
Ercules Point, East cliff	42 38 30	63 34 29	
Delgado Point, S.E. cliff	42 46 15	63 36 49	
Lobos Peak..........................	42 49 0	63 44 9	
Nuevo Gulf, Point Ninfas.............	42 58 0	64 19 49	
Chupat River, entrance...............	43 20 45	65 3 9	

RIO DE LA PLATA TO CAPE HORN—CONTINUED.

	Lat. S.	Long. W.	Var. 1866.
SOUTH SIDE OF THE PLATA—cont.	° ' "	° ' "	
Tombo Point	44 7 0	65 14 49	
Santa Elena Port, Spanish Observatory	44 30 40	65 21 59	
Santa Elena Port, S.W. cove, Beagle's Observatory	44 32 15	65 22 49	16° 20' E.
Port Melo, Sugar-loaf Island near	45 4 10	65 48 0	
Port Malaspina, South point	45 10 10	66 32 9	
Cape Aristazabal, S.E. pitch	45 12 45	66 31 29	
Nodales Ledge	45 43 10	67 17 39	
Tilly Road, Point Marques	45 57 0	67 34 39	
Bauza Head, summit	46 41 20	67 10 49	
Cape Three Points, N.E. pitch	47 6 20	65 51 19	
Cape Blanco, N.E. summit	47 12 20	65 43 49	
Port Desire, East Islet	47 44 40	65 49 39	17° 50' E.
Port Desire, Ruins	47 45 0	65 55 34	
Penguin Isle, Mount at North end	47 54 45	65 45 29	
Sea Bear Bay, Beach on South side	47 56 49	65 47 49	
Shag Rock	48 8 25	65 56 45	
Watchman's Cape, Monte Video	48 18 55	66 21 49	18° 25' E.
Bellaco or St. Estevan's Rock	48 30 50	66 13 14	
Port St. Julian, Cape Curioso	49 11 10	67 38 19	19° 6' E.
————————, Shag Island	49 16 0	67 41 51	
Cape Francisco de Paulo, extremity	40 41 18	67 37 19	
Santa Cruz, Mount at the entrance	50 8 30	68 23 0	
Broken Cliff Peak, the brink	50 14 30	68 35 4	
Lion Mount, the summit	50 20 0	68 53 19	
Observation Mount, summit	50 32 35	69 3 29	
Coy Inlet, Height on South side of ent.	50 58 27	69 9 6	
Cape Sanches, extremity	51 6 56	69 7 19	
Tiger Mount, summit	51 21 36	69 7 18	
Cape Fairweather, extremity	51 32 5	68 59 4	
Gallegos River, Observatory Mound	51 33 21	69 0 31	20° 45' E.
————————, North Hill	51 49 56	69 28 19	
Friars, Northern and smallest	51 49 12	69 13 49	
Friars, Southern and largest	51 50 8	69 12 39	
Convents, Northern	51 52 9	69 22 19	
Convents, Southern	51 53 1	69 20 39	
The VIRGIN'S CAPE, S.E. extremity	52 18 35	68 21 25	21° 0' E.
Dungeness, extremity	52 22 40	68 25 29	
Mount Dinero, summit	52 18 25	68 33 39	
Cape Possession, centre	52 16 35	68 57 14	
Cape Orange, Peak	52 28 10	69 29 44	
Queen Catharine Point	52 32 0	68 44 25	
Cape Peñas	53 51 30	67 33 35	
Cape St. Ines	54 8 0	67 9 5	
Cape St. Diego, extremity	54 40 35	65 5 53	20° 50' E.
STATEN ISLAND, &c. [2]			
Middle Cape, the Rocks	54 48 20	64 45 35	20° 30' E.
Cape South, extremity	54 51 0	64 45 55	
Cape St. Bartholomew, middle point	54 53 45	64 45 45	

RIO DE LA PLATA TO CAPE HORN—CONTINUED.

	Lat. S.	Long. W.	Var. 1866.
STATEN ISLAND—continued.	° ′ ″	° ′ ″	
Cape Colnett, the Islet	54 42 15	64 18 45	
Port Cook, Observatory mark, summit ..	54 45 16	64 3 0	
Port Cook, head of the Port, on the S.W.	54 46 25	64 3 0	
Cape St. John, eastern extremity	54 42 50	63 43 25	
Hole in the Wall, on the South side	54 49 20	63 55 40	
Good Success Bay, North head	54 47 0	65 11 45	
Spanish Harbour, Point Kinnaird	54 57 5	65 46 54	
Barneveldt Isles, centre	55 48 54	66 43 48	
Evout's Island, centre	55 33 0	66 44 3	
Lennox Harbour, point at North end of Beach	55 17 4	66 48 3	
CAPE HORN, South summit ......[3]	55 58 41	67 16 15	22° 25′ E.
St. Martin's Cove, head of it	55 51 9	67 33 3	
Orange Bay, middle of it	55 30 50	68 4 23	
Isles of Diego Ramirez:			
South or Boat Isle, summit	56 26 35	68 40 20	
Northernmost Rock	56 22 25	68 40 45	
Isles of St. Ildefonso, southern rock	55 53 30	69 17 15	
———————, highest summit ..	55 52 30	69 18 45	
PORT FAMINE, in the Strait of Magalhaens ....[4]		70 58 0	22° 0′ E.

NOTES.

1. MONTE VIDEO.—The difference of longitude between Rat Island, Monte Video, and Vilganhon Island, according to the chronometric measurement of Admiral Fitz Roy, in the *Beagle*, is 13° 4′ 24″. The same by Captain Foster, 13° 4′ 45″; by Capt. King, 13° 4′ 27″; by M. Barral, 13° 4′ 21″; and in the *Beagle*, in 1830, 13° 4′ 30″. The mean of these meridional differences, which so nearly coincide, is 13° 4′ 37″, which we have taken, and which, added to 43° 8′ 55″, the longitude of Vilganhon, gives the longitude in the Table.

The observations that have been made for determining the position astronomically, also, very nearly agree with this result. One was made by M. Ferrer from the passage of Mercury, in 1787, as 56° 13′ 30″; and a similar observation by Triesneker, in 1789, made it 56° 12′ 6″, or, as calculated by Ferrer, in 56° 13′ 36″. (See Note 7.)

Captain Mouchez, also, in 1861, had several sets of observations to determine its longitude; these were referred to the custom-house, which is 1′ 12″ W. from Ratos Island. Some of these were made in the *D'Entrecasteaux*, November and December, 1861, and to these were added those made by the chronometers of the steamer *Saintonge*, of the Imperial Mail Packet Service. These chronometers were carried backward and forward in six voyages to Rio and Buenos Ayres, where they were compared with the excellent astronomical clock at the Observatory of Messrs. Daviet and Jaggley. The mean of the whole of these series of observations makes the custom-house at Monte Video to be in longitude 56° 12′ 8″, or Ratos Island, 56° 13′ 12.7″ W., exactly as we have given it in our previous editions.

2. **Staten Island.**—This Island was accurately and completely surveyed by Lieutenant E. N. Kendall, of H.M.S. *Chanticleer*, in 1828. The positions are those of Admiral FitzRoy.

3. **Cape Horn.**—The longitude of the summit of this Cape is stated in Captain King's Tables as 67° 10′ 53″ (= 67° 14′ 53″), and in Admiral Fitzroy's Tables as 67° 16′ 0″ (= 67° 16′ 15″), which, as the distance from Port Desire, as run by the *Beagle*, in 1832, was found to be 1° 20′ 40.5″, we have placed it in the Table according to this result.—(See also Captain King's Tables, p. xiii.) But it may be remarked, that taking Port Famine as 4′ more than Captain King's position (see next Note), it will still bring it 1′ 22″ East of Admiral FitzRoy's. We have not attempted to reconcile this difference: the remainder of the coasts of Tierra del Fuego are according to Captain King's determination.

4. **Port Famine.**—The Observatory at this place is the zero point of the surveys of Captain King, and which he places in 70° 54′ West of Greenwich, assuming Rio Janeiro to be in 45° 5′ 3″ West.—(Sailing Directions for Patagonia, &c., Introd. p. vii.) But as we have taken the latter as 3′ 52″ West of this, it would make it in 70° 57′ 52″. Captain King, by several runs, makes the meridional difference between Monte Video and Port Famine as 14° 44′ 31″; this, added to the longitude of the former place, would make it 70° 58′ 3″. Lastly, Admiral FitzRoy makes 5° 2′ 20″, as the difference between it and Port Desire; this gives 70° 57′ 54″. It will, therefore, be sufficiently near to assume it as 70° 58′ 0″, which is 4′ West of Captain King, and 15″ West of Admiral FitzRoy's determination. The positions of Tierra del Fuego are those of Captain King, with the addition of 4′ to the longitude.

V.—COAST AND ISLANDS OF AFRICA, FROM THE RIVER GALLINAS TO CAPE LOPEZ.

	Lat. N.	Long. W.	Var. 1866.
	° ′ ″	° ′ ″	
River Gallinas, entrance	7 0 1	11 38 5	
Cape Mount (1,046 feet), western beach	6 43 0	11 21 9	
Cape Mesurado, extremity	6 19 15	10 49 0	19° 30′ W.
————, the Cape trees	6 17 29	10 49 25	
St. Paul's River, entrance	6 22 0	10 37 0	
Monrovia, Government house	6 19 1	10 48 5	
Bassa, Directors' house	5 54 50	10 4 5	
River Sestros, or Grand Cestos, S. entr.	5 26 25	9 34 45	
Baffou Point	5 9 10	9 17 30	
Bloo Bara, or Barbarra Factory	4 59 15	9 2 5	
Middle Neefoo, or Niffou	4 45 3	8 32 2	20° 10′ W.
Cape Palmas, flagstaff	4 22 9	7 44 16	
Tahou	4 24 47	7 21 30	
Grand Bereby	4 39 3	6 54 30	
St. Andrew's River, King George's Town, within Swartou Corner	4 57 8	6 3 47	
River Fresco, or Rio de Lagos, off the mouth	5 1 8	5 32 5	
Grand Lahou	5 8 3	4 57 40	
Jack Jaques	5 11 8	4 26 8	
Assinee River, anchorage S.E. of the	5 3 5	3 12 7	
mouth	4 58 45	2 35 5	
Apollonia	4 52 18	2 14 45	

COAST AND ISLANDS OF AFRICA—CONTINUED.

	Lat. N.			Long. W.			Var. 1866.
	°	′	″	°	′	″	
Fort St. Anthony	4	52	18	2	14	45	
Cape Three Points	4	44	30	2	5	45	
Acquidah	4	45	27	2	2	8	
Dixcove	4	47	45	1	56	40	
Elmina, or St. George del Mina	5	5	0	1	22	30	20° 40′ W.
CAPE COAST CASTLE, Flagstaff and Time Ball	5	5	25	1	13	51	
Mauree, or Moree, flagstaff	5	7	30	1	9	0	
Anamaboe, flagstaff	5	10	12	1	7	12	
Cormantine, flagstaff	5	10	30	1	5	56	
Tantumquerry, flagstaff	5	13	30	0	46	48	
Devil's Hill, summit	5	18	36	0	39	0	
Barracoe, point	5	29	0	0	24	0	
ACCRA, British flagstaff	5	31	53	0	11	30	20° 30′
Ningo, fort	5	45	0	0	1	48E.	
Volta River, entrance	5	46	0	0	41	0	
Cape St. Paul	5	43	30	0	52	18	
Quitta, flagstaff	5	54	48	0	55	5	
Padiana, town	5	57	42	0	57	18	
Little Popoe, road	6	13	0	1	36	0	
Great Popoe, road	6	16	0	1	46	0	
Whydah, or Ajuda	6	19	0	2	5	0	
Appee	6	22	0	2	25	0	
Porto-Novo, hill	6	20	0	2	34	0	
Porto-Novo, road	6	19	0	2	34	0	20° 0′
Badagry, shore hut	6	24	10	2	53	25	
Badagry, road	6	20	0	2	57	48	
Lagos River, entrance	6	26	0	3	26	10	
Benin River, N.W. point [2]	5	46	0	5	4	0	
Rio dos Esclavos	5	34	0	5	5	48	
Terra Formosa, West point	4	28	0	5	41	39	
Terra Formosa, Eastern point	4	19	24	5	54	33	
River Nun, or Quorra, or Niger, the Bar [3]	4	16	0	5	56	0	
Rio Bento, or Second River	4	17	0	6	15	0	
Rio St. Nicholas, or Third River	4	18	0	6	24	0	
New Calabar River, Foche Point	4	22	40	7	0	0	20° 0′ W.
Bonny River, Rough Corner	4	23	40	7	7	0	
Old Calabar River, Tom Shot's Point, West of the entrance	4	36	0	8	19	0	
Backasey Gap, East of the entrance	4	29	0	8	32	0	
Bimbia Isle	3	57	0	9	13	48	
Cape Camaroens	3	53	0	9	0	0	
Camaroens Mountain, peak	4	13	0	9	12	0	
Rumby Mountains, highest peak	4	57	0	9	18	0	
Qua Mountain	5	15	0	8	51	0	
Corisco Island, N.W. point	0	55	54	9	19	45	
Cape Esterias	0	37	48	9	21	0	
Point Clara	0	30	30	9	20	30	
Cape St. John	1	9	40	9	21	35	
Gaboon River, Round Corner	0	18	5	9	20	0	
Cape Lopez, or Lopo Gonçalves	0	36	12S.	8	45	17	21° 0′ W.

COAST AND ISLANDS OF AFRICA—Continued.

	Lat. N.	Long. E.	Var. 1866.
AFRICAN ISLANDS.	° ′ ″	° ′ ″	
Fernando Po			
Clarence Peak	3 35 0	8 46 30	20° 10′ W.
Cape Bullen, Northern extremity	3 47 25	8 43 24	
Adelaide Islet	3 34 48	8 47 17	
Point William, flagstaff	3 45 20	8 47 38	
Cape Horatio, N.E. extremity	3 46 15	8 54 24	
Cape Vidal, E. extremity	3 39 18	8 56 18	
Cape Barrow, South Rock	3 11 30	8 40 0	
Cape Eden, S.W. extremity	3 15 30	8 25 6	
Cape Badgley, W. extremity	3 19 42	8 24 42	
Charles' Folly (Pta. S. Carlos), N.W. extremity	3 28 50	8 29 58	
Goat Isle (Is. das Cabras), centre	3 32 50	8 34 36	
Ilha do Principe, or Prince's Island:			
Ilheo do Diamante	1 40 42	7 27 54	21° 0′ W.
Ponta do Capitaõ	1 40 0	7 32 48	
Santo Antonio Pay, Fort Sta. Anna	1 39 30	7 26 30	
Ponta Pedrinha	1 38 20	7 21 47	
Pedras Tinhosas, or the Brothers, S. one	1 21 10	7 17 30	
San Thome', or St. Thomas Island			
Ponta do Figo	0 30 0	6 31 48	22° 5′ W.
Cabras Island	0 24 10	6 41 31	
Anna de Chaves Bay, Fort S. Sebastiaõ	0 20 30	6 42 38	
Ponta da Balea	0 0 45	6 29 42	
Ponta Furada	0 13 50	6 25 49	
Ilheo das Rolas	0 0 30 S.	6 30 0	
Anno Bona			
Ilheo da Tartaruga, or Turtle Island	1 24 28	5 38 10	
Point Esteves	1 24 18	5 35 45	
South Point, Rock off	1 28 35	5 36 45	

NOTES.

1. Windward and Gold Coasts.—In a former edition of this work it was endeavoured to investigate, by comparison, the longitudes of the different points between Sierra Leone and the Bight of Biafra: which was so far successful as to prove the existence of very material errors in some works of repute then in general use.

In February, 1822, H.M.S. *Leven*, of 26 guns, with the gun brig or sloop *Barracouta*, left England, under Admiralty orders, for the purpose of surveying the whole of the Eastern and the greater portion of the Western Coasts of Africa. These vessels proceeded in the first instance to Rio Janeiro, and there the observations were made which have been alluded to in the preceding notes. On the 9th of June they left Rio, and thence proceeded to the survey of the Bays and Cape of Good Hope, and the shores of the Indian Ocean.

The dreadful mortality which subsequently attended this expedition was almost unprecedented, but the survey was continued with undaunted perseverance; and, at length, the Eastern Coast of Africa, with the Ethiopian Archipelago, including

Madagascar, having been completed, the ships returned to the Cape of Good Hope in November, 1825; and from this place a *track survey* of the Western Coast commenced, which terminated at Sierra Leone, and was completed in January, 1826.

But there still remained for examination a considerable portion of the *Windward* and *Gold Coasts*; and this deficiency was in some measure supplied by Captain Owen's second voyage in H.M.S. *Eden*, in 1827, corroborated by remarks made, nearly at the same time, in H.M.S. *Esk*, commanded by Captain Purchas, and which were, in many instances, accordant, as shown in the Errata and additions to Captain Owen's Tables, published by authority in 1829.

The survey of the Windward and Gold Coasts has however been completed, and is before the world. It has been executed by Captain Vidal and his coadjutors, in H.M.SS. *Ætna* and *Raven*, during the year 1838. The work terminates at Corisco Bay, to the South of the Bight of Biafra. A portion of Captain Vidal's positions is given in the Table.

2. River Benin.—The entrance of this River was surveyed, in 1826, by Captain Vidal, and the officers of H.M. sloop *Barracouta*; and hence eastward and southward all the coast has been surveyed, as shown in note (3), page 32.

3. River Quorra.—In the beautiful chart of this important River, by Captain William Allen, published in 1837, the East point of the entrance, formerly given by mistake in 6° 4′ E., is laid down in lat. 4° 20′ N., long. 5° 55′ E. The Bar, with 2 to 4 fathoms over it, extends 2 leagues southward from the mouth of the River, which demonstrates the strength of the ebb tide. Within the Bar, in an extent of 4 miles, the depths are 6 and 7 fathoms, but diminishing thence upwards. The town of *Eboe*, or *Ibue*, on the western bank of the River, is in lat. 5° 42′, long. 6° 26½′; *Damoogoo*, or *Ada-mugu*, on the eastern bank, in lat. 6° 30½′, long. 6° 48½′; *Attah*, on the East side of the River, lat. 7° 6′, long. 6° 58′; *Mount Purdy*, on the East, below King William's Range, lat. 7° 24½′, long. 7° 3′; *Mount Franklin*, on the same side, lat. 7° 37′, long. 7° 4′; confluence of the *Quorra* and *Tchadda*, lat. 7° 47′, long. 7° 6′; *Kakanda*, on the West, lat. 8° 22′, long. 6° 54′; *Egga*, on the same shore, lat. 8° 43′, long. 6° 41′; *Rabba*, on the East, the termination of the survey, lat. 9° 14′, long. 5° 27′.

VI.—THE COAST OF AFRICA, FROM CAPE LOPEZ TO THE CAPE OF GOOD HOPE, ETC.

	Lat. S.	Long. E.	Var. 1866.
	° ′ ″	° ′ ″	
Cape Lopez, or Lopo Gonçalves, N. extremity	0 36 12	8 43 0	21° 0′ W.
River Mexias, N. point of entrance	0 53 0	7 47 0	
River Fernan Vas	1 15 0	8 54 26	
Point Santa Catharina	1 52 0	9 11 25	
River Sette	2 22 30	9 30 36	
Pta. Pedras	2 42 0	9 48 40	21° 0′ W.
Cape Yumba	3 15 0	10 32 36	
Point Matooti	3 22 30	10 37 28	
Islet South of Point Matooti	3 20 0	10 43 25	
Point Banda	3 55 30	8 57 56	
Point Kilongo	4 16 30	11 18 56	

THE COAST OF AFRICA—CONTTNUED.

	Lat. S.	Long. E.	Var. 1866.
	° ′ ″	° ′ ″	
Indian Point	4 40 0	11 44 36	
Black Point	4 49 0	11 47 56	
Point Malemba	5 18 30	12 6 50	
Kabenda Ray, Point Palmas, or Kabenda Hook	5 32 0	12 7 50	
Red Point	5 44 0	12 4 36	
Congo River, Shark Point	6 4 36	12 5 0	21° 30′ W.
Congo River, Cape Padrõ	6 8 0	12 10 56	
Mangal Grande Wood	6 39 0	12 30 56	
Funta Bay, North Point	6 56 30	12 46 26	
Cousa or Couza River	7 12 0	12 50 30	
Ambrizette, factories	7 18 0	12 59 50	
Aravat Mountains	7 36 40	13 3 36	
Ambrizette Point	7 41 0	13 0 20	
Ambrizette Villages	7 44 0	13 3 30	
Ambriz Bay, Strong Tide Corner	7 47 0	13 6 25	21° 35′ W.
Masula Bay, Mouth of the Onzo River	8 14 0	13 14 50	
Cape Dandé	8 28 0	13 17 30	
Cape Spilimberta	8 36 0	13 19 30	
Cape Lagostas	8 45 6	13 15 18	
Loanda Island, North Point	8 46 12	13 13 55	
St. Paulo de Loanda, Town flagstaff [1]	8 48 6	13 12 27	22° 0″ W.
Point Palmarinhas	9 7 10	13 1 20	
Coanza River, Molli, or North Point	9 20 0	13 10 20	
Black Rocky Point	9 37 3	13 10 20	
Cape Ledo, extreme	9 46 0	13 15 50	
Cape San Blas, or St. Blaize, extreme	10 1 30	13 21 50	
Rio Longo, North Point	10 19 30	13 34 50	22° 30′ W.
Old Benguela Head	10 47 30	13 44 50	
Rio Cubo	10 55 0	13 54 20	
Novo Redondo, the Fort	11 12 0	13 54 10	
Quicombo Point	11 18 15	13 51 36	
Whale's Head	11 35 0	13 49 30	
Rio Tapado, or Egito	11 51 0	13 48 0	
Rio Logito	11 58 30	13 48 56	
Lobito Point	11 20 0	13 44 30	
St. Philip de Benguela, Fort flagstaff [2]	12 33 55	13 23 42	23° 5′ W.
St. Philip's Bonnet	12 34 24	13 17 50	
Point San José	12 35 0	13 12 30	
Salinas Point, extremity	12 49 0	12 54 30	
Loacho or Luash Harbour	12 59 30	12 59 0	
Camena or Equimena Bay	13 12 0	12 53 0	
Elephant Bay, S.W. point	13 14 0	12 48 40	
Pta. dos Frades, or Friars' Point	13 14 0	12 48 50	
Cape St. Mary, or Sta. Maria	13 26 0	12 34 50	
Cape St. Martha	13 52 0	12 29 0	
Das Matilhas Bay	14 4 0	12 24 20	
Tiger Bay	14 13 0	12 22 50	23° 35′ W.
Mount do Velho	14 25 0	12 23 0	
Point Sta. Gertruda	14 49 30	12 13 50	
Mossamedes Bay, Point Euspa	15 7 30	12 9 20	
Cape Negro, pillar	15 40 42	11 58 50	25° 0′ W.
Port Alexander, Sandy Point	15 49 0	11 53 0	

COAST OF AFRICA—CONTINUED.

	Lat. S.	Long. E.	Var. 1866.
	° ′ ″	° ′ ″	
Point Albina	15 52 0	11 47 0	
Great Fish Bay, Tiger's Point	16 30 0	11 46 10	
River Nourse, entrance	17 15 0	11 51 0	
Cape Frio, extreme	18 24 0	12 2 20	25° 40′ W.
Bay of San Ambrosio, North Point	20 16 0	13 7 0	
Cape Cross, or Sierra	21 48 0	13 56 50	
Rocky or Da Serra Bay, North Point	22 9 0	14 6 50	
Walvisch Bay, Pelican Point	22 52 30	14 27 10	27° 0′ W.
Sandwich Harbour, or Porto d'Ilheo	23 30 0	14 6 30	
B. de la Conceiçao	24 0 0	14 31 0	
Hollam's Bird Islet	24 38 0	14 32 20	
Spencer Bay, Mercury Island	25 42 0	15 0 0	
Hottentot Bay, North point	26 7 0	14 58 0	
Ichaboe Island	26 19 0	15 0 0	28° 5′ W.
Marshall Rocks	26 24 0	14 57 0	
Angra Pequena; Diaz, or Pedestal Point	26 38 24	15 7 25	
Ilheo Secco	26 48 0	15 7 0	
Ludovic Island	26 50 0	15 11 0	
Bol Islet	26 59 0	15 14 0	
Possession Island, South point	26 57 0	15 12 39	
Boyd's Island	27 0 0	15 13 0	
Whale Bay	27 22 30	15 21 0	
Angras Juntas	27 47 0	15 40 0	
Orange, or Gariep River, Dry bar	28 38 0	16 27 40	28° 55′ W.
Cape Voltas	28 44 0	16 31 40	
Koussie River	29 54 0	17 11 0	
Cape Donkin	31 54 12	18 14 12	
Cape Deseada	32 18 24	18 24 30	
St. Helena Bay, Paternoster Point	32 42 12	17 54 3	
Castle Cape	32 46 48	17 50 18	
CAPE TOWN, Observatory and time ball	33 56 3	18 28 45	29° 45′ W.
		h m s	
——— in time		1 13 55.0	
——— in Greenwich time, p.m.		11 46 5.0	29° 45′ W.
Saldanha Bay, N. point of entrance	33 1 48	17 48 30	
Dassen or Coney Island, centre	33 26 12	18 5 30	
Robben Island, Minto Hill lighthouse	33 47 48	18 22 40	
Table Bay, Green Point lighthouse	33 54 5	18 24 5	
———, Cape Town, Castle flagstaff	33 55 12	18 25 53	
———, Devil's Berg, the peak	33 57 12	18 25 39	
Hout Bay, York Point	34 3 25	18 20 0	
Cape of Good Hope, lighthouse	34 21 12	18 29 30	29° 45′ W.
———, Bellows Rock	34 23 48	18 29 50	
False Bay, Roman Rocks lighthouse	34 10 45	18 27 30	
———, Simon's Bay, time signal	34 11 28	18 31 40	
Cape Hangklip, or False Cape, extreme	34 23 48	18 50 20	
———, pile on hill	34 22 35	18 50 5	
Point Mudge, extremity	34 27 12	19 10 30	
Danger Point, extremity	34 41 24	19 22 0	
Dyer Island, centre	34 43 42	19 27 0	
Quoin Point, extremity	34 48 48	19 40 0	
Cape Agulhas, lighthouse	34 49 46	20 0 40	29° 40′ W.

COAST OF AFRICA—CONTINUED.

	Lat. S.	Long. E.	Var. 1866.
	° ′ ″	° ′ ″	
Struys Bay, Struys Point, extreme	34 42 24	20 16 0	
Cape Infanta, extremity	34 30 48	20 53 0	
Kaffir Kuyl Bay, Morris Point	34 23 0	21 31 0	
Cape Vacca..........................	34 19 42	21 56 24	
Flesh Point, extremity................	34 15 0	22 3 0	29° 40′ W.
Cape St. Blaize, lighthouse	34 11 10	22 9 31	
Knysna River, entrance E. Point	34 6 30	23 9 40	
Plettenberg Bay, Delgado or Seal Cape, extremity	34 4 48	23 22 24	
Cape St. Francis, extreme	34 10 0	24 52 40	
Algoa Bay, Cape Recife lighthouse	34 1 30	25 42 8	29° 30′ W.
———, Coega or Kuga River entrance	33 48 36	25 42 48	
———, Sta. Cruz I., peak	33 47 36	25 45 30	
———, Bird Island, lighthouse	33 50 27	26 17 30	
Padrone Point, extreme	33 46 30	26 24 30	
Port Alfred, Kowie River, entrance	33 33 42	26 50 9	29° 30′ W.
Great Fish Point, extreme	33 30 12	27 2 20	
Great Fish River, mouth	33 27 0	27 7 20	
Waterloo Bay, Maitland signal hill	33 28 0	27 3 0	
Keiskamma River, S.W. point of entr. ..	33 16 12	27 31 39	

NOTES.

1. St. Paul de Loanda.—The town flagstaff, according to Captain W. Owen, is 5° 12′ 12″ W. from the Devil's Peak, or in long. 13° 14′ 24″. Between the same place and Ascension the meridian distance is 27° 45′ 48″, which will place it in 13° 10′ 30″, a considerable variation from the former one; the mean of them is 13° 12′ 27″.

2. Benguela.—The meridian distance between the fort flagstaff at Benguela and the Devil's Peak at the Cape of Good Hope, is 5° 1′ 30″, according to the measurement made in a short run in the *Leven* and *Barracouta*, in 1825. This will place Benguela flagstaff in 13° 25′ 6″. Captain Heywood measured the meridian distance between St. Helena and Benguela flagstaff as 19° 6′ 18″, which will place the latter in 13° 22′, 18″. The mean of these two will be 13° 23′ 42″, as in the Table.

3. Table Bay and the Cape of Good Hope.—The Observatory at Cape Town and the *time ball* in front of it, are described hereafter. The observations for determining its position were commenced by the lamented Rev. Mr. Fallows, in 1829-30. Mr. Henderson, his successor, has finally determined its longitude, as stated below. Upon this important place most of the positions on the East and West Coasts of Africa depend; and therefore the corrections applied to it have been extended to those places in connection with it.

Captain Owen, the surveyor of these coasts, said:—"At the Cape of Good Hope we were first required to exercise that precision and care upon which the whole value of our future work was to depend. This point was made the first meridian, from which to date all our longitudes. But even here, perhaps the most frequented and prominent cape in the world, considerable discrepancies were found to exist in its reputed situation. Some of the most established authorities had placed it in a longitude from 11′ to 8′ eastward of our observations. The most critical remarks of the late astronomer, the Rev. F. Fallows, had, however, reduced that difference to 3½′ of longitude; but as our observations agree in every particular with those of the indefatigable Maskelyne and De la Caille, there is still much reason to place full confidence in our results, as published by the Admiralty, in a Table of Latitudes and Longitudes determined by Captains Owen and Vidal."—(Vol. II., p. 377.)

Here we are under the necessity of pointing out that Captain Owen was not so correct as he imagined. The Observatory has been since finally settled by Mr. T. Henderson, the resident astronomer, who gave its situation as 33° 56′ 3″ S., and 18° 45′ 28″ E. From this deduct 2′ 52″ (*diff. long.*), and it gives the citadel flagstaff in 18° 25′ 53″ (or 1^h 13^s 55^m in time), or 4′ 53″ E. of Captain Owen. This is very nearly the same as we formerly gave it from Captain Heywood, and as subjoined. Annexed are the results obtained, respectively, by the several observers:—

The Cape Castle, according to the Abbé de la Caille in 1753, lies in	18	24	52 E.
The astronomers Mason and Dixon, in 1791, placed it in	18	23	15
Captain P. Heywood, by run from St. Helena	18	26	5
Captain Owen, in 1822	18	21	0
Captain Horsburgh, from various runs, &c.	18	28	30
Finally:—the Observatory, by Mr. Thomas Henderson, is in	18	28	45
The Citadel flagstaff	18	25	53
The Devil's Peak	18	26	39
The Lighthouse	18	24	9

SECTION II.

GENERAL OBSERVATIONS ON THE WINDS, TIDES, AND CURRENTS; AND ON THE DIFFERENT PASSAGES OVER THE SOUTH ATLANTIC OCEAN.

1.—OF THE WINDS.

GENERAL REMARKS.—(1.) In order to give a proper account of the meteorology of the South Atlantic Ocean, or of any similar area, it is necessary to take a wider range to embrace those natural influences which cause the peculiarities of each region. Of late years this important subject has received much greater attention, and more exact observation has been imported into it than in former times, when vague speculation and inconclusive arguments were deemed sufficient to determine the practical application of the motions of the aerial and marine currents to the purposes of navigation.

But even now we cannot affirm that the absolute truth is arrived at, and very many important points, more interesting to the scientific enquirer than to the seaman in his vocation, remain totally unsolved. To pursue these enquiries, however interesting, would be out of place here. But a few general remarks on the circulation of the atmosphere may be useful as a preliminary to the descriptions of the various general and local winds which are met with in the South Atlantic. This has been done in our volume on the North Atlantic Ocean; and as it is desired that this work, though supplementary to that, should be complete in itself, a portion of these remarks are inserted here.

(2.) As a broad and primary principle, it may be affirmed, the complete circulation of the atmosphere, by which any particle of the air has in its course passed over every portion of the earth's surface, is demonstrated by the fact that the air is composed of precisely the same elementary constituents in every part of the world. This fact was experimentally demonstrated by the French Academy of Sciences many years since, who had bottles of ait most carefully collected in all regions and submitted to the most rigid analysis, which failed to discover any difference whatever. It is manifest in a natural sense also, by its supporting animal and vegetable life universally in the same manner. If it were not so, the air which existed over a special region would, in the course of ages, have become subject to the emanations and influences of the earth it covered. The same remark holds good also with the water of the ocean, equally universal in its definite characteristics, and from the same cause, as will be shown hereafter. The manner in which this is carried on is still involved in some mystery.

(3.) In the year 1686, Edmund Halley* proposed the theory of the Trade Winds and Monsoons, which is now generally received as an approximation to the true solution. He afterwards altered his views, which were revised and extended by George Hadley in 1735.† The following is a brief summary of them :—

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* Philosophical Transactions, xvi. 153.

† Ibid., 1735, p. 58.

(4.) The sun is constantly vertical over some part of the earth between the tropics, and this zone is consequently maintained at a much higher temperature than the regions nearer the Poles. This heat on the earth's surface is imparted to the air, which is, therefore, displaced and buoyed up from the surface, and the colder, and therefore heavier, air from without glides in, on both sides, along the surface; while the displaced air, thus raised above its due level, and unsustained by any lateral pressure, flows over, as it were, and forms an upper current in the contrary direction, or towards the Poles; which being cooled in its course, and also sucked down to supply the deficiency in the extra-tropical regions, keeps up thus a continual circulation.

Since the Equator revolves much more rapidly than the portions nearer the Poles, it follows, that a mass of air flowing towards the Equator must be deficient in rotary velocity, and, therefore, unable to keep up with the speed of the new surface over which it is brought. Hence these currents from the North and South must, as they glide along the surface, at the same time lag or hang back, and *drag upon* it in the direction *opposite* to the earth's rotation, *i.e.* from East to West. Thus, from simple northerly and southerly winds, they become permanent *north-easterly* and *south-easterly winds.*

The lengths of the diurnal circles increase very slowly near to the Equator, and for several degrees on each side of it hardly change at all. It follows from this, then, that as these winds approach the Equator, their easterly tendency must diminish; and at the Equator must be expected to lose their easterly character altogether. And not only this; but the northern and southern currents, here meeting and opposing, will mutually destroy each other, leaving only the actions of local causes, which may lie in one region in one way, and in another a different one.

The result of this, then, is the production of two great tropical belts of north-easterly and south-easterly winds, while the winds in the equatorial belt which separates the two former should be free from any steady prevalence of an easterly character, and should also be comparatively calm. All these consequences are agreeable to observed fact, and constitute the system of the reguly *trade winds.*

(5.) The constant friction of the earth upon the air near the Equator, it may be objected, would, by degrees, destroy the rotation of the whole mass; but it is compensated in this manner. The heated equatorial air, rising and flowing off toward the Poles, carries with it a rotatory velocity much greater than that of the surface over which it passes in its northward and southward progress. Hence it will gain more and more on the surface of the earth, and assume more and more a *westerly* relative direction; and when, at length, it necessarily returns to the surface in its circulation, which it must do, more or less, in all its course, it will act on it by its friction as a powerful S.W. wind in the northern hemisphere, and a N.W. wind in the southern, and thus restore the equilibrium. This is the origin of the S.W. and westerly gales so prevalent in our latitudes, and of the almost universal westerly winds in the North Atlantic.*

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* Sir John Herschel gives the following note in his work upon the origin of storms, which, as it is most feasible, we give here: it must be observed, that it was written before the views and observations of Reid, Redfield, and others had been published. We shall advert to it hereafter.

"It seems worthy of inquiry, whether hurricanes in tropical climates may not arise from portions of the upper currents prematurely diverted downwards before their relative velocity has been sufficiently reduced by friction on, and gradually mixing with, the lower strata; and so dashing upon the earth with that tremendous velocity, which gives them their destructive character, and of which hardly any rational account has yet been given. Their course, generally speaking, is in opposition to the regular trade wind, as it ought to be, in conformity with this idea.—(*Young's Lectures*, i. 704.) But it by no means follows that this must always be the case. In general, a rapid transfer, either way, in latitude, of any mass of air which local or temporary causes might carry *above the immediate reach of the friction of the earth's surface,* would give a fearful exaggeration to its velocity. Wherever

(6.) Now it will be seen that, by this theory, the trade winds *meet* near the Equator, leaving a belt of calms of various breadth between them. According to Commander Maury, the winds here being neutralized rise up and cross each other; the wind brought by the S.E. trade passing over N.E. trade as a S.W. upper current; and, having passed the calms or variables of the Tropic of Cancer, it appears as the ordinary anti-trade or S.W. prevalent wind. The chief physical fact upon which this theory is based is the red dust, found frequently to fall on vessels near the Cape Verdes, and in the Mediterranean, where it is called scirocco dust (as coming from the South.) This red dust was found by Ehrenberg to consist of microscopic infusoria and organizations, whose habitat, *as far as was known*, is in South America. But this argument may be demurred to from the limited extent this dust falls upon compared with the vast area from which it is said to be derived.

(7.) There is another great difficulty in the reception of this theory, in the great breadth, in some parts, of that intervening band of calms that these supposed currents are to cross each other. In the eastern part of the Atlantic, it is from 300 to 600 miles in breadth. If this great interchange of directions were continually going on with such a vast amount of atmosphere, we may safely conclude that the lower strata would not be characterised by the calms or "doldrums" they are known by.

(8.) The more reasonable argument, in the present state of our knowledge, is, that the trade winds reaching this belt of calm, by far the greater part of this indraught will rise on its own side, and revert towards the pole of its own denomination in a precisely opposite direction to that by which it arrived. In the parts of the equatorial regions, where this intervening calm belt is much narrower, as on the East coast of America, this crossing may take place, and the upper currents pass on towards the poles of *contrary* names. At all events, this view of the circulation of the atmosphere will satisfy our first proposition,—that every particle of air has been so commingled with the rest, that it produces the universality of character which is demonstrated to exist. These theories are practically unimportant to the sailor in his profession, but are highly interesting* to him as a subject of observation and reflection.

It has been held by many that the solar heat, combined with the revolution of the earth, is sufficient to account for the general phenomena of the winds; but there are still some difficulties in the way of accounting for some of the periodical winds which are found to recur with great regularity. This has been reasoned for by Mr. Hopkins, who argues that the trade wind at times blows towards areas of great condensations; in other words, that a great rain-fall occasions a corresponding indraught.† Another agent in giving the easterly direction to the trade winds, suggested by Commander Maury to be Magnetism; but this subject, of the magnetism of the air and the influence of the solar heat on it, is as yet hidden too much in obscurity to draw any certain deductions therefrom.

(9.) There is one feature of the atmosphere which has been involved in some obscurity, or, at least, has been the subject of controversy. It is the condition of *aqueous vapour*, at all times present in the air. It is a very important question, as upon this water-bearing property of the air, evaporation, condensation, and rain depend, and consequently climate and fertility to the earth. The doubts may be briefly stated. The eminent chemist, Dalton, demonstrated that one gas (and aqueous vapour is such) could permeate or exist in connexion with another gas with-

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such a mass would strike the earth, a hurricane might arise; and should two such masses encounter in mid-air, a tornado of any degree of intensity on record might easily result from their combination."—*Astronomy*, p. 132. The more recent views of Sir John Herschel will be found in their place hereafter.

* See further on these subjects, Maury's "Physical Geography of the Sea, 1860," pp. 149, 175. Sir John F. W. Herschel, Ency. Brit., 1859, xviii. 577. Captain Basil Hall, "Fragments of Voyages and Travels," 2nd series, i. 162.

† Mr. Hopkins: "The atmospheric changes that produce Rain and Wind:" also see Journal R. Geog. Soc. 1856, pp. 158, et seq. See also D. Vaughan, U.S. in Brit. Association Report, 1860, p. 41.

out displacing its bulk, and that water was thus diffused through the atmosphere without increasing its volume. Therefore, in estimating the height of the barometer, account must be taken of the amount (or weight), and elasticity (or tension) of the vapour, and *subtracted* from the height of the mercury, to give the true weight of the dry air. With a dew point temperature of 87° 35′ the pressure of moisture is equal to the weight of 1·26 inches of mercury, and must be *subtracted* from the height shown by the barometer, as above stated. This is the view held by Dalton, Ure, Regnault, Daniell, Sir Henry James, &c.

In opposition to this, Professor Patton, of Bombay, maintained that moisture did *displace* an equal or equivalent volume of air, and that therefore it was only the difference of their amount which should be applied as a correction, and he estimated the amount of vapour above stated to be equal to a pressure of only 0·518 of an inch of mercury. But the first theory is thought to be the most feasible.*

(10.) Leaving the field of conjecture, we come to the actual condition of the atmosphere which covers the North Atlantic Ocean in particular, and generally the whole earth. Its elevation or weight is ascertained by the barometer, as is well known. According to the decrease in the height of the mercury on ascending to great elevation, it is calculated that at 15 miles the air is rarefied to about 25,000 times, and at 80 or 90 a perfect vacuum exists. It presses with a mean force 14·73 lbs. per square inch, and forms one 1,125,000th part of the mass of the whole earth. The trade winds do not reach more than to 3 miles in height, and it is probable that all the phenomena of clouds and vapours occur beneath the height of 4 to 5 miles.

(11.) If the surface of the earth were evenly covered with land or water, or a combination of both infinitely intermixed, the phenomena of the trade or anti-trade winds would form symmetrical zones around the globe; but the relative proportions are very different in the two hemispheres, being 100 land to 150 water in the northern, and 100 to 628 in the southern.† There is a still greater contrast, if we take the horizon of London as a great circle dividing the earth into two hemispheres. It will be then seen, that London is in the centre of that half which includes all the land, except Australia; and the other half all the water of our globe. From this cause the line of meeting between the N.E. and S.E. trades is in all seasons *northward* of the Equator in the Atlantic; and, from the land influences on the trade winds to the N.E. of Africa, there is a wide space of calms, or doldrums, whose base lies against that continent, and its apex stretching toward the coast of Brasil, as is readily seen by the illustration of the trade winds diagram, which will explain far better this peculiarity than a verbal description.

(12.) The *force* with which the wind blows is the chief consideration of the sailor, in connexion with the study of the subject. This force is readily measured in a fixed observatory, or on board a ship at anchor; but not so when she is under sail, as it is manifest that she is then apparently feeling less wind than is actually blowing, from being drifted before it. We have had some singular accounts of some of the fine clipper ships scudding at an immense rate before a gale which has been marked as of no extraordinary violence, while other ships, dull sailors, have been dismasted or disabled by the fury of the same gale, from their not being able to bear away before its great velocity. Therefore the *recorded* force of the winds met with at sea should be subject to this qualification,—what are the sailing powers of the ship which has recorded them. We have no *standard* of sea-rates for the wind as yet. Perhaps it would add to the value of such observatons if the sailing powers of all ships engaged in adding to our knowledge were tested when both close-hauled and running free upon a wind of known velocity.

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* See "Abstracts of Meteorological Observations by the Royal Engineers, 1853, 4," by Sir Henry James, R.E., F.R.S.

† The dry land, as far as it is known, is estimated to occupy 49,806,000 square statute miles. If this is increased to 51 millions for the unknown polar regions, it will allow 146 millions of square miles to be covered by the ocean.—*Sir J. Herschel.*

In former times the vague terms of breeze, gale, hurricane, &c., sufficed to describe the relative character of the wind. The late Sir Francis Beaufort devised a system of simple notation which more exactly defined these forces, and which is now in universal use at sea. The figures prefixed indicate the estimated character of the wind:—

(*Beaufort Notation.*)

0 Calm.
1 Steerage way.
2 Clean-full from 1 to 2 knots.
3 ditto 3 to 4 knots.
4 ditto 5 to 6 knots.
5 With royals ("close hauled").
6 Top gallant sails over single reefs.
7 Two reefs in topsails.
8 Three reefs in topsails.
9 Close reefed topsails and courses.
10 Close reefed main topsail and reefed foresail.
11 Storm stay sails.
12 Hurricane.
From 2 to 9 being supposed "close hauled." *

(13.) The wind over the land is found to be generally of much less force and velocity than at sea, so that the Beaufort notation was found inconvenient for land purposes; Mr. Glaisher, therefore, has proposed another notation for this use, which is now adopted at Greenwich, Liverpool, and indeed at most of the principal observatories. It divides the force into the numbers 1 to 6, which have been proportioned to the Beaufort scale as follows:—

(*Glaisher Notation.*)

1. Moderate (Beaufort scale).. 1—2)
2. Fresh....(———— .. 3—4)
3. Strong ..(———— .. 5—6)
4. Heavy ..(Beaufort scale .... 7—8)
5. Violent.... (————.. 9-10)
6. Tremendous (————..11-12)

(14.) The actual force and velocity of the wind has been calculated by Sir W. Snow Harris, by an improvement of Lind's Anemometer, by which he found, air moving 20 feet in a second presses on 1 square foot with a force of about 13 oz. avoirdupois, or at 50 feet per second it would support a column of water 1 inch high, the pressure force increasing very nearly with the square of the velocity. With these data the table on the following page has been calculated:—

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* In addition to the *figures*, showing the force of the wind, the state of the weather is to be understood by *letters*, as follows:—

Letters indicating the state of the weather (*Beaufort Notation*).

b	Blue Sky.
c	Clouds (detached).
d	Drizzling Rain.
f	Foggy.
g	Gloom.
h	Hail.
l	Lightning.
m	Misty (hazy).
o	Overcast.
p	Passing Showers.
q	Squally.
r	Rain.
s	Snow.
t	Thunder.
u	Ugly (threatening) appearance of Weather.
v	Visibility. Objects at a distance unusually visible.
w	Wet (Dew).

NOTE.—A bar (—) or dot (.) under any letters augments its signification:—thus $\underline{f}$ very foggy, $\underline{r}$ heavy rain, $\underset{\cdot}{\underline{r}}$ heavy and continuing rain, &c., &c.

TABLE, *showing the Force and Velocity of the Wind from light Airs to heavy Gales and Tempests.*

Pressure in lbs. on Square Foot.	Velocity.		Popular Descriptions.
	Feet per Second.	Miles per Hour.	
0·002	1	0·68	Gentle airs (unappreciable by gauge). *Beaufort scale,* 1.)
0·004	1·47	1	
0·019	3	2	Light airs (just appreciable by gauge); would fill the lightest sail of a yacht (2.)
0·032	3.9	2.66	
0·043	4.5	3	
0·065	5·28	3·8	Light breezes; such as would fill the lightest sails of a large ship (3).
0·071	5·87	4	
0·090	6·6	4·5	
0·100	6·98	4·75	
0·112	7·84	5	
0·130	7·89	5·38	
0·162	8·8	6	
0·228	10·4	7	
0·260	11	7·6	
0·291	11·8	8	Moderate breezes, in which ships can carry all sail (4).
0·364	13·2	9	
0·390	13·6	9·27	
0·452	14·7	10	
0·521	15·8	10·77	
0·551	16·2	11	
0·650	17·66	12	
0·780	19·3	13	Fresh breezes; topgallant sails and royals (5).
0·830	20	13·6	
0·884	20·6	14	
0·910	20·9	14·25	
1·042	22	15	
1·170	23·6	16	
1·250	24·2	16·5	
1·302	25	17	Fresh winds; reefs (6).
1·470	26·5	18	
1·563	27·39	18·67	Strong winds; treble-reefed topsails (7).
1·630	28	19	
1·790	29·35	20	
2·084	31·15	21·47	Gales; close-reefed topsails and reefed courses (8).
2·600	35·32	24	
3·126	38·73	26·40	Strong gales; close-reefed topsails, and stay sails (9).
3·647	41·83	28·52	
4·168	44·83	30·56	
4·689	47·44	32·34	
5·200	50	34	
7·800	61·18	41	Heavy gales and storms (10).
10·400	70·72	48·2	
13·000	79·07	53·91	
20·800	100	68·18	Very heavy gales; great storms; tempests (11).
26·000	111.74	76·18	
31·200	122·62	83·6	
41·600	141·30	90·34	Tornadoes; cyclones; hurricanes (12).
52·000	157·98	107.7	
62·400	173·06	120	

There is no doubt that these figures may be open to some doubt, as the subject is a difficult one, and they are given independent of the different forces exerted by aqueous vapour and by air. Sir Henry James has also given a table, more complicated, but which does not very materially differ from the above, which will suffice for the sailor's use.

(15.) In estimating the *diminishing* pressure on the barometer during the progress of a gale, it is rather difficult to understand how the force which must, in some degree, *compress* the air, and therefore make it more dense and heavy, besides the idea that such a force may tend to heap up the atmosphere in some part of the area, can show a *less* weight of air. There is one view which has not been made prominent,—that the *horizontal* force exerted by the progress of the wind may lessen its downward vertical force or pressure in the same way that a railway train in quick motion does not deflect a bridge as the same train would do if going slower; or as a skater can pass swiftly over ice that would infallibly break with his weight when quiescent; or as the apparently anomalous loss of gravity in the gyroscope when in motion. However, these considerations have no effect on the phenomena of a falling barometer with a rising wind.

(16.) The *alternation of the sea and land breezes* in warm latitudes is an important feature in coast navigation. Its cause is generally well understood. It is owing to the different powers of radiation and absorption of heat possessed by land and water. So that, generally, when the day temperature is highest on the land, the strongest will be the alternating breezes. During the day the radiation of the sun's heat on the land causes the air to expand and rise from the surface, and then the sea air rushes in to fill the void. It frequently occurs that the surface of the soil will show a temperature of 120° under the meridian sun, and sinks to 50° or 60° during the night; while the sea, rarely having a higher temperature than 80°, and, from being a bad radiator, fluctuates but very little, it follows that it is alternately warmer and colder than the land, and hence the phenomena in question. The minimum temperature of the 24 hours being a little before sunrise, and the maximum about 2 p.m., the change of these breezes occurs generally at some little time after those hours.

(17.) The wind decidedly veers round the compass according to the sun's motion, *i.e.*, from N. through N.E., E., S.E. to S., and so on, often making a complete circuit in that direction, or more than one in succession, (perhaps occupying many days in so doing,) but it rarely veers, and very rarely or never makes a complete circle in the contrary direction. This has been shown by Professor Dove to be the direct consequence of the rotation of the earth; and, although the observation was recorded by Lord Bacon in 1600, it is now known as *Dove's Law of Gyration.**

(18.) Professor Coffin, from his elaborate discussions, thinks himself authorized to lay down, as a general description of the winds of the northern hemisphere,—1st. That from high northern latitudes the winds proceed in a southerly direction, but veer towards the West as they approach a limit ranging from about lat. 56° on the western continent to about lat. 68° on the eastern, where they become irregular and disappear. The area of this zone is about 11,800,000 square miles. 2nd. That further South there is a belt of westerly winds, less than 2,000 miles in breadth, entirely encircling the earth; the westerly direction being clearly defined in the middle of the belt, but gradually disappearing as we approach the limits on either side. The area of this zone is estimated to be about 25,870,000 square miles. 3rd. That South of the zone last named the mean direction of the wind is easterly. This area is estimated to contain 60,760,000 square miles.† Professor Dové contends that there are but two Systems, the 1st and 3rd of the foregoing.‡

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* When speaking of the wind veering *with* the sun, of course the shifting of the cyclonic winds in the northern hemisphere is not included.

† "Winds of the Northern Hemisphere," by Professor Coffin, A.M., Pennsylvania, U.S. "Smithsonian Contributions to Knowledge," vol. vi. 1854.

‡ See Report, Brit. Asso., 1845. See also Professor Mitchell in American Journal of Science and Arts, vol. xix. p. 254. A great amount of information will be found on the

(19.) In the spaces which separate these wind systems those hurricanes, tornados, typhoons, or cyclones occur, which are caused by the action of currents of air moving in opposite directions; their phenomena are further controlled by the influence of the land they approach or pass over. This important branch of the present subject is fully considered hereafter, but the occurrence of storms is an exceptional case in the vast system of atmospheric circulation we have been considering.

(20.) The foregoing will suffice to show the general nature of winds and their causes, and the reasons of those modifications and derangements, which are sometimes difficult to explain in detail.

In (11) it is shown that the division between the northern and southern wind systems is always to the North of the equator, and therefore the meteorology of the South Atlantic is more simple than that of the northern part. But, as will be seen hereafter, the great influence that land has over the direction and character of the wind currents, forms on the African and Brasilian coasts, a varying condition, analogous to the well known monsoons of the eastern seas.

(21). The wind zones of the South Atlantic may be summarily described as follows, and they will be subsequently dilated on in the same order.

1. The *South-East Trade-wind*, blowing from S.E. to N.W. in the open ocean, between lat. 30° to 25° S., and lat. 2° S. to 5° N., according to the season. The zone of calms, or "doldrums," separating it from the N.E. tradewind will also be noticed.
2. The variable winds or monsoons on the Coast of Brasil.
3. The variable winds or monsoons on the African coast.
4. The variable winds and calms near the Tropic of Capricorn.
5. The *Anti Trade*, or *Passage Winds*, separated by the foregoing from the S.E. trades, and blowing, variably, from western quarters.

THE SOUTH-EAST TRADE-WIND.

(22.) The area occupied by the S.E. trade-wind is of larger extent than that over which the N.E. trade blows, for the reason that the intervening calms occupy a space North of the equator, while the polar limits are found on about the same parallel in each case. But from this space must be deducted that portion on the eastern side which lies eastward of a line joining the Cape of Good Hope and Cape Verde, where the winds blow toward the land from the southward throughout the year, a deflection of the trade-wind, which thus assumes the character of a monsoon. On the western side also the American continent so far deflects it from its normal course, that it blows to the northward of East. In the S.W. portion besides that eastward of Rio de Janeiro, the trade is very variable and uncertain.

(23.) In the central part of the area of the south-east trade the wind is remarkably steady, and of great force, so that for homeward bound ships passing the Cape of Good Hope there is a long stretch of favourable wind that can always be reckoned on as far as the equator. This will be well exemplified by the illustrative chart, which will explain the relation of this true trade wind with those deflections previously alluded to on either side of it.

(24.) The relative strength of the N.E. and S.E. trades has been the subject of some controversy. Captain Maury contends that from the difference of 0·055 inches in the mean barometric pressure, as observed by the Dutch between the parallels of

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general subject in the works of Kamtz and Romme, who have also laboriously studied and generalized the phenomena of the winds, and to whose labours much that is here said is owing. But by far the largest collection of observations, arranged in order, is contained in Capt. Maury's "Pilot Charts," before alluded to, which are well known to all sailors.

5° and 20° in the N.E. and S.E. trades, being 29·968 for the former, and 30·023 for the latter, that the S.E. trades are proportionately stronger, and finds that the homeward bound vessels (2,235 in number), with the wind abeam, have an average rate of 5·6 knots an hour, while in the S.E. trades, with the wind generally dead aft, their rate is 6 knots. He contends that if the wind were abeam instead of dead aft, that this rate of sailing would be increased 2 or 2½ knots, which would make the difference still more manifest.

(25). This branch of the subject, the relative velocity of the two trade winds, has been more largely discussed by Lieutenant Brito de Capello, of the Portuguese navy, and we therefore give the entire essay as follows, which will clearly express the data and conclusions arrived at.

(26.) In the following remarks the strength of the wind is inferred from the rate of sailing per hour of all the ships during the two epochs, when the N.E. and S.E. trade winds attain their extreme range; that is in the months of February and March, and August and September.

(27.) It is true that, generally speaking, the rate obtained at the two periods selected may not be critically accurate in respect of the strength of the wind if we take two consecutive days. This rate will depend on the variableness of the wind and the different boards the ships are obliged to make. Nevertheless, in the central districts of the trades, where the direction of the wind is nearly constant and simultaneously favourable to the route, the rate obtained at the two periods will be a sufficient measure of the strength of the wind, setting aside the effect of the currents, &c. In the zones of calms and light airs, for instance, the distance sailed by the ship is much less than that gone over in the course of twenty-four hours. Nevertheless, we may here also obtain the strength of the wind from hourly progress shown by the journals themselves without the result obtained from two epochs.

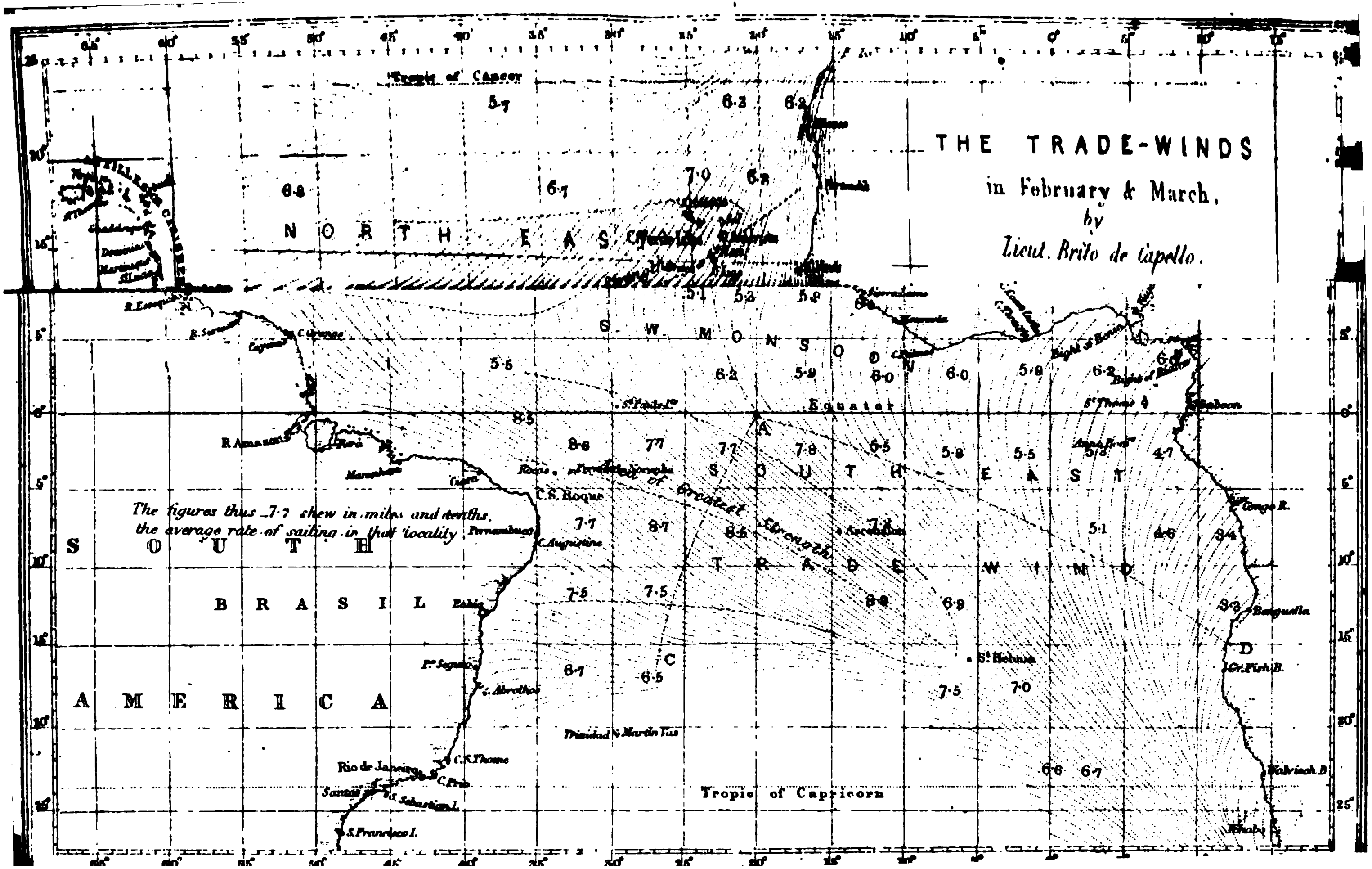
(28.) In all cases the direction of the wind as respects the course must be considered. It becomes necessary to reduce all these to one single condition: for instance, to the most favourable point of sailing for all ships, that is with the wind free, say from nine to ten points. These corrections I have effected by means of coefficients, thus approximating to a correct rate. The value of these co-efficients is calculated on the hypothesis that the rate of a ship is very nearly 0·7 of the rate she would attain under the same condition of wind when going free; that the rate with the wind aft, and also when within a point of it, is 0·8 of that when going free; that with the wind at twelve or fourteen points it is 0·9 of that going free.

Such a proceeding is undoubtedly empirical; but the mean results appear to be a very close approximation to the truth, considering the nature of the inquiry. Again as the various regions in the Atlantic at the two periods are represented by the deduced rate of similar routes from the same corrections, and from the same nations, the relative results are not sensibly altered, and are in fact the relative numbers belonging to the two different epochs which are under consideration. We have for these two epochs 1,548 tracks—796 Dutch, 662 American, and 90 Portuguese.

(29.) In order to find the mean hourly rate of sailing for each zone of 5° of latitude throughout the different longitudes, we have added together the numbers which represent the tracks every day in the same zones of American and Dutch ships following similar routes. Having taken their mean, and found the hourly rate of sailing, we have applied to this last the coefficients to reduce them to the rate with the wind free. Where the American and Dutch routes differ in the courses sailed by each, their coefficients differ also, and these have been first applied to obtain the figures for each zone, and the average calculated afterwards.

(30.) *The N.E. Trade.*—For the N.E. trade at the two epochs under consideration we have 803 routes, viz.: 424 Dutch and 379 American.

The region of the N.E. trade is divided into four portions. 1. The eastern and most frequented by ships going South and passing to the East of the Cape Verds. 2. The mean route of ships going South, passing West of those islands. 3. The cen-



THE TRADE-WINDS

in February & March,

by

Lieut. Brito de Capello.

The figures thus 7·7 shew in miles and tenths, the average rate of sailing in that locality.

tral part of routes to the southward for ships from Europe and America. 4. The part containing the westernmost American home return routes.

(31.) *February and March.*—For the first of the above portions we have twenty tracks—fifteen Dutch and five Americans. We apply to the hourly rates the coefficient 0·9 (as divisor) to correct them for the wind free, this being generally twelve to fourteen points. The mean rate thus found from the parallel of 30° N. to 5° N. is 6·1 miles.

For the second portion we have seventy-one tracks—fifty-four Dutch and seventeen Americans. The coefficient 0·9 is used as far as the parallel of 15° N. for the same reason. The mean rate between the same parallels of 5° and 30° N. is 6·3 miles.

From the combination of 165 tracks of Dutch ships and 97 Americans, we obtain the mean result of the central portion. Here we have used the divisor 0·8 for all the Dutch tracks, the navigation being generally with the wind at seven points nearly. The American numbers are not altered. The mean rate between the parallels of 5° N. and 25° N. is 6·5 miles.

Finally, in the westernmost portion the strength of the wind is deduced from forty-four tracks of American ships, navigating with the wind free, from 32° to 33° West of Greenwich from the equator to 25° N. Here there are no corrections, and the mean rate is 6·7 miles.

The mean rate in the whole region of the trades during the months of February and March is 6·4 miles free.

(32.) *August and September.*—During the months of August and September the N.E. trade is weakest, and is in its most northern position of the whole year. Notwithstanding this, the mean strength of it on the African side appears to be greater than that at the epoch of February and March.

For the two months we extend our enquiry only as far as the parallel of 15° N. on the eastern side, and as far as the parallel of 10° N. on the western side. To the S. of these parallels is the zone of calms and the S.W. monsoon.

This region is again divided into the same four portions, the only difference consisting in the central portions, which are re-divided, the average rate of Dutch ships and American being more apart than in the months of February and March.

In the first portion (East of the Cape Verde Isles) the average wind blows a little stronger than at the epoch already mentioned. The strength of the wind is deduced from fourteen tracks of the Dutch and four Americans. The average rate between the parallels of 15° and 35° N. is 6.3—0·2 miles superior to the corresponding one of February and March. The divisor 0·9 has been applied, the direction of the wind being nearly the same as at the other epoch.

In the tracks West of the Cape Verde Islands the average track of 130 Dutch and 25 American ships is over 6·5 miles; the divisor is again the same 0·9, and the rate is 0·2, exceeding the same in February and March.

In the central and western portion a great difference in the intensity of the wind is observed in comparison with that of February and March. Sixty-nine Dutch ships homeward give the mean of 5·6 miles in the three sections where the N.E. trade prevails, having the divisor 0·8 applied, the coefficient of the wind at seven points.

Some degrees further to the West, 129 American ships going southward give the mean of 5·1 miles, with the coefficient of 0·8 in the first section, 0·9 in the second; the third section is not altered, the wind being free.

The tracks of thirty-five American ships from the southward for their own ports leave no doubt of the relative weakness of the wind in parts more and more to the westward. In these parts the further West the wind is the more free. The mean rate between the parallels of 10° and 30° N. is about 4·8 miles.

The mean rate, running free, in the whole region of the N.E. trade during August and September is then 5·7 miles, 0·7 less than in February and March.

Very great differences may be observed during the two epochs in the central and western regions. While in February and March the rates in the two central and western portions exceed respectively 0·1 and 0·3 miles the general mean rate in the months of August and September, we find the contrary—the two central and western ones are less than the mean general rate of 0·4 and 0·9 respectively.

This last result is well worthy of observation, because it is contrary to the general belief that the wind gains in strength more and more throughout the year in proportion as the distance from the African coast is increased.

(33.) *The S.E. Trade.*—The strength of the S.E. trade, properly called, is represented at the two adopted epochs from 655 ships—417 Dutch and 238 American. For the region of the S.W. monsoon in the Gulf of Guinea and the sea along the African coast to the parallel of 15° S. we have the average rate of 90 Portuguese ships. In these last tracks the wind being generally foul, and under the influence of the current, the hourly rates are deduced direct from the journals.

We have divided the whole extent of ocean from the zone of calms as far as the southern limit of the S.E. trade into three regions:—

1. The northernmost and easternmost, or simply the easternmost, where the S.W. monsoon almost entirely prevails, and the S.W. wind of the gulf and near the coasts, is limited by the African shore and the line B A D (see plates). Herein the strength of the wind, as above mentioned, is obtained from Portuguese ships.

2. The region we call western is comprised between the coast of Brasil and the lines B A C. The strength of the wind here is obtained from Dutch and American ships going southward.

3. The remaining region, which may be called central and southward, or simply central, is bounded by the southern limit of the trade, and the lines C A D. Here the strength of the wind is obtained from Dutch and American ships coming from the East Indies.

The limits of these three regions expand and contract according to the seasons.

(34.) *August and September.*—In this space the S.E. trade extends to the parallels of 10° to 15° N., and changing its first direction, and converting itself even into a S.W. monsoon to the northward of the equator, from 30° to 35° W. of Greenwich near the African coast.

(35.) Commencing with the eastern part, we have here the mean hourly rate of progress of fifty-one Portuguese ships, to which we have applied the above coefficients to bring them to our condition. The results are shown by the figures in each of the five compartments along the coast. It is in the course of these two months that the S.W. winds of the gulf are the strongest of the whole year.

It must nevertheless be observed that the ships from which we have obtained our results are not generally good sailers, being old; but as some compensation for this, the rates obtained were more correct, being collated from journals on board and from day to day.

The strength of the wind in the central region is represented in these two months by 124 tracks with the wind aft,—eighty-five Dutch and thirty-nine Americans.

(36.) The mean track of the two groups is from 3° or 5° East of Greenwich, in 25° South, to the equator, in 33° or 21° West of Greenwich. The tracks spread more and more in proportion as they approach the equator. The mean rate of the Dutch between 25° S. and the equator is 5·7 miles with the wind aft, or 7·1 free. In the westernmost part the American ships appear to have the wind strongest, although the difference in the figures may be attributed to the superiority in sailing of these ships, or perhaps to some difference in their having the wind in some sections, the wind drawing more to starboard. These tracks continue only to 5° S. The other sections belong to the western division. The mean rate of sailing of the American ships is nearly 6·2 miles—perhaps 7.7 free.

(37.) In the western region South of the equator we have for the two months 232 ships—146 Dutch and 86 Americans. These are divided into two groups, following the example of Messrs. Maury and Andrew. The eastern one is formed of 162 ships —123 Dutch and 39 Americans. The mean track of these crosses the equator between 21° and 22° W. and in 20° in 20° S. is in 29° W. The western group includes 70 ships—47 American and 29 Dutch; the mean track of which crosses the equator between 27° and 28° W., and the parallel of 20° S. in 33° W. The routes of both are nearly the same, and have the correction of seven points. The mean rate of the eastern is 6·0 miles, or 7·5 corrected; and that of the seventy ships to the westward 5·9 miles or 7·4 miles corrected. The difference of 0·1 mile which the western one shows, arises perhaps from some of their boards made to double Cape St. Roque and Cape St. Augustine. It is properly in the second section, opposite the most salient part of the coast of Brazil, that the rate of the western ships is less than that of the eastern.

(38.) To the northward of the equator we have only two average northerly routes as far as the parallel of 5° N. The westernmost is deduced from thirty-nine ships (American); the average rate in this solitary section is 6·0 miles, or 7·5 corrected. The eastern one comprises eighty-five Dutch tracks, giving a mean of 5·0 miles, or 6·2 miles corrected. In the second section, in consequence of the uncertainty of the lay, the resulting mean is rejected.

The mean corrected hourly rate of the whole western region, reckoning the American tracks to the northward, is 7·3 miles.

(39.) *February and March.*—The divisions are the same as for the former epoch. The three regions determined are in the same relative positions, excepting that they are a little moved to the southward.

The western and central regions both reach the equator, and the eastern one as far as the parallel of 5° N. on the meridian of 12° W. The southern limits are 5° further South than those of August and September.

The hourly rates are found from similar tracks and from ships of the same nations, and consequently the figures undergo the same modifications; that is to say, the same coefficients are applied in similar sections, and hence results are obtained perfectly fit for comparison between the same epochs.

The strength of the wind in the eastern region is represented by the mean hourly rate of thirty-nine Portuguese ships. The strength of the wind in the gulf is considerably lessened, whilst that about the coast to the South of the equator is, on the contrary, augmented.

The mean strength of it in the whole eastern region corresponds to the average rate, corrected, of 4·9 miles.

(40.) In the central region we have the same Dutch and American tracks. The average rate of 110 Dutch ships from 30° S. to the equator is 5·4 miles, or 6·8 corrected. The difference between the rates of these two sets in these two months is 0·7 miles, 0·1 mile more than that of August and September.

In the western region there are the same number of Dutch and American tracks.

The easternmost, composed of fifty-six Dutch ships and fifteen Americans, gives the average rate of 5·7 miles, or 7·1 scarcely, corrected, from the equator to 20° S.

The tracks further West of fifty-one American and twenty Dutch ships give the average rate of 5·8 or 7·2 miles corrected. It may also be observed, that the western rates are inferior to the eastern only off Capes St. Roque and St. Augustine. This anomaly may be accounted for in the same manner as for the former epoch.

(41.) The strength of the wind for the whole western region is represented by the corrected average of 7·0 miles, taking into account the value of 6·0 miles rate of the first section of the American tracks to the northward.

(42.) The difference in the strength of the wind in the whole region of the S.W. monsoon in the S.E. trades for the two epochs, is scarcely 0·1 mile in the average corrected rates.

By not taking the S.W. monsoon into the calculation, we can compare the strength of the S.E. trade, properly so called, for the two epochs in consideration. In the months of August and September, the average rate of the S.E. trade proper is equal to 7·1 miles, corrected; while in the months of February and March it is 6·9 miles, less by 0·2 mile.

The slight difference in the strength of the S.E. trade, although the region in which it prevails is subject to great changes from one epoch to the other, appears to be well marked.

Whatever may be the amount of confidence in the coefficients employed in this investigation, as they enter into the identical tracks of the ships of the same nation, it is certain that the relative value of the corrected rates obtained cannot be materially altered, and consequently the same may be said of the relative force of the wind.

The N.E. trade undergoes in the two epochs considerable change of strength. The difference between the strength of it at the two epochs amounts to 0·7 mile in the wind corresponding to 5·7 corrected rate.

With respect to the two trades, the greatest difference between their intensities is observed at the epochs of August and September,—that is, when the S.E. trade appears to attain its greatest strength, and the N.E. has its least.

Again, as to the S.E. trade proper, this difference amounts in August and September to 1·4 miles; that is to say, the strength of the S.E. trade surpasses that of the N.E. by an amount capable of adding 1·4 miles to the corrected rate of 5·7 miles.

If, at this same epoch, we compare the N.E. trade with the S.E. trade along with the S.W. monsoon, the difference is only 0·7 mile.

During the months of February and March there is an excess in the N.E. trade over its antagonist, the S.E. with its S.W. monsoon of the gulf; but there results, on the contrary, an excess of 0·5 mile in the rate of the N.E. trade when comparing it only with the S.E. proper.

(43.) The charts show the mean direction of the winds and their deviations, according to the Dutch, of the Meteorological Institute of Utrecht, Maury's wind charts, Admiral Chabanne's and the tracks of the Portuguese ships in the Gulf of Guinea, and they show those regions where the wind, on an average, blows harder, or with an intensity beyond a certain number of miles an hour, corrected.

The limits of these different districts are found by constructing the curves of progress for each set of routes; on these are shown sections of rates determined (6·5, 7.0, 7·5 miles). These sections transferred to their places give the parabolic and other figures shown in the charts.

The portion of the N.E. trade where the wind is over 6·5 miles, corrected, assume a figure, formed in the months of August and September, showing the greatest intensity is between the meridians of 20° and 25° W.

(44.) The central lines bear figures indicating the zones where the wind blows the strongest in the whole extent of the regions under consideration. The lines inclining to the equator include several degrees, and even change their direction from one epoch to the other. The extent of these lines is greater in the N.E. than the S.E. trade.

Comparative Table of the Strength of the S.E. Trade and S.W. Monsoon in the Months of August and September and February and March.

REGIONS, Etc.		August and September.	February and March.
		Corrected Rates.	
Eastern and Northern Regions.	S.W. Monsoon, North of Equator	5·4	..
	S.W. Monsoon of Gulf of Guinea	6·0	4·7
	S.W. Monsoon of Coasts of Angola, Congo, &c.	4·5	4·8
	Entire region of BAD	5·3	4·9
Central and Southern Regions.	Dutch Ships' tracks	7·1	6·8
	American Ships' tracks	7·7	7·5
	Entire Central Region	7·4	7·1
Western Region.	Eastern side	7·3	7·1
	Western side	7·6	7·0
	Entire Western Region	7·5	7·0
General Averages		6·4	6·3

(45.) *Extent.*—The limits of the South-east trade wind are very difficult to define verbally. The illustrative diagrams will be far more efficient in giving an idea of of its varying extent and borders. On the North it is separated from the N.E. trade wind by the belt of equatorial calms or doldrums and side monsoons, which are more fully described in our North Atlantic Memoir; but a few words will be given hereafter on this part in connexion with the changing winds on the African coast.

(46.) Further to the westward, the northern limit of the S.E. trade is found further to the northward than is marked in the foregoing, the line of separation running across the ocean in a diagonal direction, generally from W. by N. to E. by S.; but it would also appear that the calms do not pass South of the equator, but this is scarcely the case, for at times the S.E. trade fails in lat. 6° S. off the Brasilian coast in the months of February, March, and April, when the full effect of the vertical sun is limited to the southern hemisphere. During the rest of the year it is seldom or never lost South of the equator.

(47.) The southern limits are also very indefinite, and much more so on the western than on the eastern side of the ocean. "The calms of Capricorn," as they have been termed, are also very vague in their extent and limits, but they are much narrower on the East than on the western side. Here again the diagrams will be more expressive than a verbal description. But it may be observed, that while the belt of calms or varying winds is or may be only 4 or 5 degrees of latitude in breadth on the eastern meridians, it is seldom less than two or three times that breadth on the American side. The lines given on the charts are chiefly derived from Captain Maury's observations, but these are so far imperfect that it is very difficult to define a mean where the data are so vague. The wavy boundaries thus shown are rather the effects of this uncertainty of where the trade wind absolutely fails and the calms or variations set in.

(48.) The following table, derived from Captain Horsburgh, has been usually given to define the extent of the calms between the trade winds, but it must be remembered that this is only applicable to the limited area over which ships sailed across the equator in former years. Now that a much wider range in longitude is taken, and a much more westerly route is frequently taken in sailing southward, it becomes necessary to extend the information which was sufficient in former years. For this see the charts.

TABLE, *showing the Equinoctial Limits of the N.E. and S.E. Trade Winds, between the Meridians of* 18 *and* 26 *degrees West.*

N.E. TRADE WIND.			S.E. TRADE WIND.		INTERVAL BETWEEN.
CEASES.	General Extremes.	Probable Mean.	General Extremes.	Probable Mean.	Mean Breadth.
In January at....	3° to 10° N.	5° N.	0½° to 4° N.	2¾° N.	2¼ degrees.
February	2 to 10 —	4 —	0½ to 3 —	1¼ —	3½ ,,
March........	2 to 8 —	4¾ —	0½ to 2½ —	1¼ —	3½ ,,
April	2½ to 9 —	5 —	0 to 2½ —	1¼ —	3¾ ,,
May	4 to 10 —	6½ —	0 to 4 —	3½ —	4 ,,
June	6½ to 13 —	8½ —	0 to 5 —	3 —	5½ ,,
July	8½ to 14 —	11 —	1 to 6 —	3½ —	7½ ,,
August	11 to 15 —	13 —	1 to 5 —	3¼ —	9¾ ,,
September	9 to 14 —	11½ —	1 to 5 —	3 —	8½ ,,
October	7½ to 14 —	10 —	1 to 5 —	3 —	7 ,,
November	6 to 11 —	8 —	1 to 5 —	3 —	4¼ ,,
December	3 to 7 —	5½ —	1 to 4½ —	3¼ —	2¼ ,,

(49.) In a previous part (6) to (8), page 36, it is said that the trade winds meeting near the equator become either neutralized, rise up and cross each other, or that they rise on their own side, and revert towards the pole of their own denomination; and that this upper aerial current, reaching the tropic of Capricorn, descends and forms the source of the anti-trade winds to the South of it.

(50.) Captain Henry Toynbee, to whom meteorology is much indebted, has paid much attention to this subject in some recent voyages, and in a communication to the Royal Society (June, 1865), he gave the result of his barometric observations, which are here quoted from. The original is illustrated by some interesting diagrams, which are not repeated here.

(51.) Having lately made five voyages to India, leaving England on the 1st of July and returning early in April, I have observed the recurrence of certain facts relating to the weight and circulation of the air in the same part of the world at the same seasons of the year, from personal registration of the barometer, wet and dry bulb thermometers, direction and force of the wind, &c., five times daily.

These five voyages have carried us through the Atlantic Oceans from 50° N. to 40° S. lat. in the months of July and August; again returning home, we have passed from 34° S. lat. to 5° N. lat. during the months of February and March each year.

(52.) We are told that the Great Sahara Desert being heated by the sun of the northern summer causes an upward current of air, which draws in the air from the sea to restore equilibrium, just as the heated lands in India during the same season cause a S.W. monsoon in the Bay of Bengal, where a N.E. trade would otherwise prevail. Our barometer diagrams show this by being lower near Africa, and gradually rising as the distance from the demand is increased. Again, in about 13° N. lat., where the S.W. monsoon commences, it is always much more from the West than it is further southward, where the wind draws to the South, and very generally turns into the S.E. trades without any intervening calm. In fact, this heated part of Africa seems at this season to have the power of bringing the N.E. trades to an end in about 17° N. lat. between the islands and the main, instead of 13° N. lat. outside, and of causing an indraft from the westward; it also gradually turns the S.E. trade which blows near Africa into a S.W. wind, which we may suppose finds its way into the upper stratum of air over this heated land. Part of this S.W. monsoon seems to be formed of the damp cloudy air which exists in the doldrums, whilst the rest is evidently formed of clearer air—another evidence that it is part of the S.E. trades.

(53.) Having thus considered the curves of the outward passage from England with respect to their difference when further East or further West, we will view them in a North and South direction. It will be noticed that the lowest barometer occurs in the belt of doldrums, between the trades; and by comparing the outward with the homeward route it will be seen, as is well known, that this belt is further North in July than in March. It is interesting, however, to see that the lowest barometer travels North or South with the belt of doldrums, showing that its cause must be sought for there, and not in centrifugal force, which might be supposed to fix it at the equator.

(54.) The sailor is naturally led to ask how it is that the barometer is lower here, a zone towards which two trade winds are pouring in an immense body of air along the earth's surface, and in nearly opposite directions; for near the equator the trades draw more North and South. We suppose there can be but one answer, viz., that here the air rises, and forms those two upper currents which rush towards the poles, above and counter to the trade winds. Maury tells us that the so-called African dust is really South American, and that much more rain falls in the northern than in the southern hemisphere, from which he argues that the air which formed the S.E. trades, having traversed more sea and picked up more moisture, rises in these doldrums, and travels to the N.E. above the N.E. trades; and *vice versâ*, that the N.E. trades travel to the S.E. above the S.E. trades. He does not say how they pass each other, neither can we, but we have strong evidence of a current of air travelling above and in opposite direction to the trade winds, because we generally see the high clouds travelling in that direction. We have, however, as it were, even seen the air ascending; for on the 15th of March, 1865, in 4° 18′ N. lat., and 20° 33′ W. long., when we had light fleecy clouds passing over us from the N.E., and we lay becalmed and roasting, longing for the trades, my chief officer came and reported to me with a hopeful countenance that he had seen these light fleecy clouds travelling from the N.E. None but those who have experienced these calms can imagine how anxiously wind is looked for: to the N.E. of us there was an arch of clouds in the sky extending from the S.E. to the N.W. points of the horizon, with a calm and low barometer on the South side of it where we were, and (as we found afterwards) the N.E. trade and a higher barometer on its North side; therefore the arch of clouds was probably formed by the condensation of moisture as the air rose, while we lay becalmed at the foot of the inclined plane of still air, up which the N.E. trade was just commencing its ascent.

(55.) Travelling South across the equator, it will be noticed how uniformly the barometer rises until we arrive at the southern limit of the S.E. trades; but on referring to the homeward curves in February, it will be noticed how much lower the barometer ranged then than in August. The homeward route through the Atlantic differing much from the outward, does this difference of barometer arise from difference of seasons or difference of longitude? By comparing the routes near the equator, where they come very close to each other, and where the difference of height in the quick-silver is as great as in any other part, I am led to think that it depends upon the different seasons.

(56.) Whilst speaking of the homeward route, it is interesting to remark, how on leaving the Cape of Good Hope we invariably had a valley, as it were, in the atmosphere, which quickly rose as we sailed to the N.W., even though we may have started in a south-easter, which is the high-barometer wind in these latitudes. I had noticed that after rounding Cape Agulhas with a south-easter and high barometer, the column fell suddenly after rounding the Cape of Good Hope, though the S.E. wind continued; and I suppose that the fall is caused by the air's ascending as it comes in contact with the high land: the curves seem to support this opinion.

(57.) At both seasons of the year there is a heading-up of the air at the polar end of each trade, in the place where Maury tells us that two upper currents come to the surface of the earth (6); the one we have already alluded to, which comes from the equator towards the pole, moving above the trades, clouds proving its existence; the other, Maury tells us, rises at the pole, and travels as an upper current, above the strong westerly winds which prevail in high latitudes, towards the equator; it can hardly be expected to have many clouds, he says, as its moisture must have been condensed by cold before rising at the pole, so that it becomes cold and dry.

We may ask what evidence the sailor can give for this theory as deduced from observation.

(58.) First, then, from these heaps of air he finds two surface winds blowing in opposite directions: the one moving towards the equator is cool, dry, and heavy, the other moving towards the pole is warm, damp, and light. He may well say, If two surface winds blow in opposite directions from this heap of air, there must be air brought to it by an upper current or currents to keep up the heaping; but he may naturally ask, how do I know that an upper current comes from the pole? First, because the prevailing surface winds in high latitudes blow towards the pole, which air must return; and secondly, because the trade winds are composed of cool dry air, which could not have come from the equator: here there is pretty good evidence that two upper currents come to the surface of the earth in these zones where the air is heaped up, and again, that in dipping to the surface by some unknown means they cross each other, as Maury conjectured.

(59.) Perhaps a few words may be desirable as to the manner in which the westerly winds which blow in high latitudes appear to draw the air from the heaps above mentioned. Here we will refer to our experience in 40° S. lat., where the normal circulation of the air is less interefered with by the land.

This parallel of latitude is subject to a series of gales which commence at N. and end at N.E. or W. As the North wind sets in, the barometer falls, the air becomes warm, damp, and cloudy; the wind gradually draws round to the N.W., after a time rain accompanies the wind, the barometer continues to fall, often fast, until in a heavy shower of rain the wind shifts to the West, when the barometer immediately rises, generally followed by a strong breeze from the westward, which decreases as the quicksilver rises, very often settling down into a calm. After a few hours the North wind sets in again, with a falling barometer, and a repetition of the whole series takes place.

(60.) One is naturally led to ask why the trade wind draws air from this heap in a regular continuous stream, when these gales are fitful. May it not be because in the direction in which the trade wind moves the meridians diverge and give plenty of room for the flow, whereas the westerly winds have converging meridians which seem to check the progress of the air. These fitful gales have always led me to think that the air was checked in its course. If further South, say in 50° S. lat., the wind continues steady from the West (as Maury leads us to suppose is the case), then this zone of 40° seems to act as a reservoir for the westerly winds, being constantly refilled and steadily drawn off, only the stream into the reservoir is freer than that which runs out.

(61.) Now if we consider that these gales are composed of the warm damp air which come to this heap from the equator above the S.E. trades, descending to the surface of the earth and travelling towards the pole, their westing is accounted for by the change in the diameter of the circular route which the air has to describe in accompanying the earth in its revolution. These gales changing from N. to N.W. and W. have been treated as the N.E. quarters of southern hemisphere cyclones;

and we read in the "Nautical Magazine" of a ship's having hove to, to allow one of them to pass; but if, as we suppose, they form part of the normal circulation of the air, it seems useless to heave to, to avoid them. The source of these gales being to the North of them is a sufficient reason why the wind does not change to South of West. The polar wind gales which are experienced in these high latitudes, seem to derive their air from that upper current returning from the pole, part of which sometimes makes its downward way to the surface in high latitudes, especially in spring.

(62.) The gales of the southern hemisphere, just remarked upon, have their exact counterpart in the high latitudes of the northern hemisphere, though I have not noticed them to be so constant, perhaps on account of there being much more land in the northern hemisphere. Still all seamen know how, after getting North of the N.E. trades, we look for the wind to come from S., S.W., and W., with warm air and rain.

(63.) These curves, and the arguments deduced from them, seem to favour Maury's theory of the circulation of the air; where he supposes two rising currents we have a low barometer, and where he supposes two descending currents we find a high barometer; but they are also suggestive, and a series made with standard instruments for each month in the year might lead to most useful discoveries as to the normal circulation, and its disturbance by the effect of land. How strikingly these curves prove the uniform state of the atmosphere in those parts of the Atlantic between the trades, at the same seasons of the year! especially in contrast with their sudden distortions on the polar side of the trades, where their irregularities resemble the waves of the sea in the same latitudes, which may in fact be called the resultants of these distortions.

(64.) **Direction.**—The principal source from which we can derive a correct knowledge of the direction and frequency of the winds of the South Atlantic, is the great mass of material accumulated and arranged in the Pilot Charts of Captain Maury. But these will not suffice for more than a general conclusion, as they are not sufficiently definite to give an exact knowledge. But this is of minor importance to the sailor; they will explain almost all that he requires to know. From the fact that in them the direction of the wind is only noticed for 16 points of the compass, omitting the "by" points, undue importance is given to these principal quarters from which the wind blows. It is therefore futile to attempt to draw more exact conclusions. The force also of the wind, an important element, is wanting in these observations, and can only be arrived at by the proportion of calms encountered.

(65.) In a previous page (42) and its illustrative chart is given the relative *force* of the winds in each area, by which the most eligible tracks for crossing the ocean may be distinguished.

(66.) The illustrative wind diagrams on the adjoining map, which are mainly derived from the figures in Capt. Maury's charts, but here arranged in a graphic form, will describe better than a long verbal account the direction and character of the trade and other winds. The arrows diverging from a centre in each square represent the prevalent direction of the wind, blowing *from* the centre, and therefore of an opposite name (thus a S.E. wind is shown by an arrow to the N.W. of the circle), the length of the arrow; being proportioned to the frequency of the wind.

(67.) In mid-ocean, or between the meridians of Greenwich, 0°, and 30° (or 35°) W. and between the equator and 30° S., the portion of the ocean most free from land influences, it will be seen that the south-east trade wind blows with great regularity, as before noticed. But there is this feature which is much exaggerated on either side of the meridians named,—that on the eastern or African side, that the wind blows much more from the southward, and on the Brasilian side much more from the eastward than the normal direction of the trade wind, and at its outer limits this S.E. trade wind is so drawn from its course that it blows at a right angle to its ordinary direction, becoming a S.S.W. and S.W. wind against the African coast, and a N.E. wind on that of Brasil. In mid-ocean also there are much fewer calms and light airs than where the wind is so much interfered with by the heated continents on either side.

(68.) A steady trade may therefore be reckoned on with much certainty in crossing its area, and it is only when the land on either side is approached, as it must be in crossing the equator, that the difficulties of contending with varying and adverse breezes have to be met. In the ensuing paragraphs some notices of these peculiarities are given.

2. Winds on the Coast of Brazil.

(69.) On the eastern coast of Brasil, between the months of September and March, the winds generally prevail from N. by E. to N.E. by E.; between March and September the prevailing winds are from E. by N. to E.S.E.

The former of these are generally termed the NORTHERLY MONSOON, and the latter the *southerly* one; although there appears, in fact, to be no direct and opposite change in them on or about the equinoxes, as is generally the case with the winds so called. These winds are simply a continuation of the S.E. trade, *which changes its direction* as above described, and is influenced by the land on its approach thereto.

The influence of the land, or rather of its *temperature*, is more or less according to the action of the sun at the particular seasons of the year. When the sun is to the northward, no particular difference is observed in the S.E. trade, but it may be carried within sight of the coast, with scarcely any deviation; nevertheless about both equinoxes, but more especially when the sun is advancing to the northward, calms and very light winds, with apparently no settled quarter, will prevail near the coast; and this may be said to be more particularly the case on that part of it between the Abrolhos and Cape Frio. As the sun advances to the southward, the trade wind will gradually come round to the north-eastward, and will have its retrogade movement with the return of the sun to the equinox. At this latter season ships, on approaching the coast, will begin to observe this northerly inclination of the S.E. trade within 4° or 5° of it, and which they will find gradually to increase as they incline to the westward.

Within a few miles of the coast, and in the different roadsteads and harbours, the wind generally blows directly upon it; and in the deep harbours, and upon the shore, this is generally superseded by a land breeze, which sometimes lasts the greater part of the night. About Rio de Janeiro this land breeze sometimes extends as far to seaward as Round Island, while at Pernambuco it rarely reaches the roadstead.

(70.) The preceding remarks are those of Capt. Hewett. Pimentel, and, after him, M. D'Après, has said that the winds of the northerly monsoon, between September and March, are from N.E. and E.N.E., or less northerly than as above; and that those of the southerly monsoon are from E.S.E. to S.S.E., or more southerly. It may, therefore, be admitted that they do sometimes prevail more from the South, and that those near the North but seldom occur.

(70.) Captain Hewett has observed, that the winds off Cape Frio are seldom found to the southward of East; and in the northern monsoon they are generally to the northward of N.E. Heavy and violent squalls are occasionally met with in rounding the cape, to obviate the effects of which every precaution is required.

The same officer adds, that at Rio de Janeiro, the sea breeze varies in its commencement from ten to one o'clock in the forenoon, and ceases in the evening between the hours of seven and eleven. At the full and change of the moon violent squalls from the N.W., named by the Portuguese "Terre Altos," immediately superseded the sea breeze, lasting from 4 to 6 hours.

(71.) The Baron Roussin has observed that the general classification of the winds into two monsoons, according to Pimentel, &c., requires considerable modification; for, in his experience on the different parts of the coast, he found the winds very variable in the two seasons. For example, in five months of a southern monsoon they had not forty days with the wind E.S.E. or S.S.E., though, on another coast, easterly winds may more certainly be expected. The navigators of these coasts reckon much more on easterly winds than any others in the months of October, November, and December, which may be considered as intervening months between the monsoons.

In the midst of these varieties we find again certain particular winds; the one accidental, the others periodical, and which seem to be of a local and limited nature. Of this class are the S.W. squalls, which come on during the rainy season, at the times of new and full moon; the Brasilians call them Rebojos, and they prevail for three or four days; moderate when accompanied by rain, but with greater strength when the sky is unsettled.

The other accidental winds are of the nature of squalls, and are found principally in the environs of the Abrolhos, hence they are called "Abrolhos Squalls." They are most frequent in the months of May, June, July, and August, when the season is very wet, and the general wind from E.S.E. They proceed, it is said, from small white and round clouds, and with a force that is irresistible.

(72.) The Land Breezes, on the coast of Brasil, are nearly regular, and are felt at night during the greatest part of the year. They are found on all parts of the coast between Maranham, in the North, and St. Catherine's, in the South, but vary in force and regularity according to the season and place. On approaching the equator, the more discernible they become. At Rio Janeiro they occur daily, and seldom rise before nine o'clock in the evening, and do not finish till the morning of the following day. Such, too, is the case at *Espirito Santo*, *Porto Seguro*, *Bahia*, *Pernambuco*, and other places similarly situated.

During the northern monsoon the land breezes are more regular than in the southern monsoon; they are also stronger, because then the volume of wind comes more direct and beating constantly against the coast, the re-action cause a freshness in the weather on shore, which produces a more regular and stronger effect.

In the southern monsoon the winds are more variable to the South and S.W.; the land breezes are mixed up with them and are not to be distinguished.

The sea breeze is mostly stronger and broader than the land breeze. This is the effect of vapour raised from the earth and accumulated in great quantity during the day; condensed afterward by the coolness of night, it falls and causes the air to expand with greater force.

(73.) Vessels cannot always be certain of finding the land breezes at a certain time in making for the ports of Brasil. But, in general, on advancing southward, following the coast, the winds in the rainy season will be found between South and West, and between the *Alagoa dos Patos* and *Cape Frio* it sometimes blows violently from between S.E. and S.W. and from the N.W., at times, there are hurricanes, similar to the *Pamperos* of the Rio Plato, which are dreadful. Of these, the prognostics are the same as of a European gale. If the sun sets environed with thick clouds, if the land appears very distinct, and seems to rise up, approaching the observer, you may expect the winds to blow from South to S.W. till it brightens up. Fortunately these gales do not long continue; when furious, they rarely last more than 24 or 30 hours, and their strength and duration diminishes on approaching the equator. When the S.E. or S.W. winds of the southern monsoon are moderate, they come strong from the eastward during the day, and approach the West during the night.

So soon as the wind approaches the East the weather always clears up. To the contrary when it turns toward the West, and the mist comes on more and more thick. The winds are stated to come from the eastward in all their tropical seas; this is their natural course; the interruptions or changes which occur, in advancing to the land, are nothing but the crisis when passing from one to another. At 7 or 8 leagues from the coast the general motions of the monsoons will be found.

(74.) The seasons of Brasil may be considered as two only; the *dry* and the *rainy*. On all the eastern coast the dry season commences near the end of September, and continues until February, and during the five months of its continuance thunder-storms frequently occur, but it seldom rains.

The rest of the year includes the rainy season; though the rains are not so constant as fully to justify the name. On the eastern coast the only months which may be thus considered are May, June, July, August, and sometimes a part of September. On the North coast the periods vary; for the heavy rains there commonly begin in December; although, as on the eastern coast, they include May, June, July, and August.

(75.) Para.—Situate immediately beneath the equator, the climate of Para is hot and sultry: the thermometer averaging throughout the day from 84° to 89° in the shade; and at night occasionally falling as low as 75°, with very heavy and copious dews, especially upon the river, wetting the boats as if a shower of rain had occurred. The river water is warm, generally 84°, as the air cools in the evening, it chills the surface of the water; and, in doing so, it emits steam or aqueous vapour into the cool atmosphere. Thus the fog, or mist, arises from the warm water at the river, and is not a deposit of dew from the atmosphere upon a surface cooled by radiation. Precisely similar to what occurs in the colder regions of the North, when water is rapidly losing its temperature, previous to freezing, it smokes with steam, and emits a vast volume of vapour, not a drop being deposited on the land; and it is to this that we must refer the mists and fogs, rising from the warm valleys, often before sunset, and not ascribe them to the deposit of dew from the atmosphere.

There is no difference of temperature throughout the year; the mean is 84°. As already shown, there are two seasons, the wet and dry. The wet or rainy season commencing in the latter end of December, and continuing until July, raining more or less, every day, for many hours, without intermission. The air is sultry and oppressive, with light variable winds, the most awful thunder and lightning, violent squalls of wind, occasionally from different points of the compass, and tremendous heavy rain. Ships are often detained several months, not being able to take in their cargo.

It generally begins to rain about eleven o'clock in the forenoon, and continues until nine or ten at night. The early part of the morning from midnight is mostly fine. The thunder-storms take place most frequently in the afternoon, about two or three o'clock. The same circumstance occurs at Rio Janeiro. The period of the hour of the storms is not confined to this place, but occurs at many others. The country is flooded in many parts during the rainy season.

The dry season at Para is from July to December. During this period rain is a frequent occurrence, and thunder-storms likewise in the afternoon. This is the windy season, it blowing fresh from the N.E. during the day, with a light breeze only in the evening. Lightning is frequent in the horizon every night.

Although, from the appearances of the banks of the Rio Para, its muddy beaches and masses of filth, it might be supposed to be the "centre of yellow fever," yet those who sleep on the river are generally healthy, and enjoy a fortunate exemption. Intermittent fevers or agues, however, attack new comers, and higher up the river they are more common. Those employed in the gathering of sarsaparilla are very frequently attacked with fever, and many natives die of it. Dysentery, tetanus, &c., are common. The small pox, in 1825, is said to have destroyed 5,000 people, and to have proved the most destructive scourge they ever experienced. Hydrophobia is almost unknown.*

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* Mr. Webster's Narrative of the Voyage of the *Chanticleer*, Appendix, p. 339—342.

(76.) **Maranham.**—The wet season commences at Maranham in the latter end of December, or the early part of January, and continues until June or July; during the whole of these months an immense quantity of rain falls, the most awful thunderstorms occur, in which lightning is remarkably vivid: the weather is oppressively hot, and the wind light and variable, veering all round the compass in the course of twenty-four hours. The dry season continues from July to December, in which period there is, generally, a fine fresh breeze from the N.E. or E.N.E. The nights are attended with lightning, but no thunder, and a few showers of rain sometimes occur.

The climate of Maranham is naturally hot, and, as at Para, there is little variation of temperature throughout the year, the average being 82°. The general range of thermometer is from 76° at night to 86° in the day time, even in the most shady situations. The barometer ranges from 29.92 to 30·1, the average being 30 inches, and the horary oscillation about the tenth part of an inch; it falls from 9 a.m. to 3 p.m., and does not appear to be affected by the fall of rain.

The climate here is generally regarded as healthy, the most sickly time being during the transition from the wet to the dry season, or about July. The wet season is not considered unhealthy.

In the province of Seara, or Ciara, to the East of Maranham, the droughts are occasionally severe. A few years ago some thousands of persons perished from the want of water. Many fled to Rio Janeiro and to Maranham, and the crops were nearly all destroyed.*

The climate of Fernando Noronha, though abounding in vegetation and moisture, is very healthy. The dry season commences in July, and continues throughout August, September, October, November, and December. The wet season is from January to June, inclusive. In the first three months of the rainy season thunder and lightning are common; and heavy surfs prevail, especially about Rat Island, at the same period when similar surfs prevail at Ascension and St. Helena, as shown hereafter, with the wind light and variable from the N.W. In the dry season there is, at times, a very scanty supply of water here, but, in the wet season, a little deluge.†

(77,) **Bahia.**—Captain Mouchez, who spent a considerable time on this coast, has given the following on the winds, &c., here.

On the coast outside Bahia the trade winds generally vary 4 or 5 points in the opposite monsoons. They blow from the East during the months of February, March, and October; from S.E. by E. in April, May, June, July, August, and September; and from E.N.E. during November, and December. This is shown in the illustrative chart.

(78.) In the roadstead of Bahia the wind comes between N.E. and S.E. for the greatest part of the year. During the S.W. monsoon, in June and July, there are frequent calms, storms from the N.W., and squalls from the S.W. This bad weather seldom lasts long, and the wind seldom gets so strong as to cause disaster; they are rather squalls of a few hours duration, after which comes a calm, with the wind from the East. But at the times of the new and full moon during this season, the southerly winds, which blow some time for two or three days consecutively, send in a very heavy sea into the outer road, particularly during the ebb tide. These are very troublesome to shipping, and make the communication with the shore to be difficult. Squalls from N.W. bring bad weather, with thunder and lightning.

(79.) Storms are extremely rare at Bahia, but occur sometimes. That best remembered occurred on St. Joseph's day, March, 19, 1817, which was a true hurricane and caused great disaster to the lower town. These meteors are very rare to the S. of the equator.

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* Voyage of the *Chanticleer*, Vol. II. p. 60.

† Idem, Vol. II. p. 26.

What is called the winter season commences in March, and lasts till August. It is the rainy season, and that in which the heat is less, but many days are as hot as the summer time. There is great irregularity in the seasons.

(80.) In the summer the dews are extremely abundant, and give sufficient moisture to the soil, to support vegetation. As on all parts of the Brasilian coast, the atmosphere is always charged with moisture, and its high temperature greatly facilitates the absorption of vapour, nearly to the point of saturation.

The changes of the land and sea breezes are very regular. Generally in the morning the wind is from N. to N.E., frequently very strong, and agreeably refreshing the atmosphere; and which, after an hour of calm, is replaced, about 10 or 11 o'clock, by the sea breeze from E.S.E. to S.E. In the evening, about sunset, this breeze sinks, and towards 8 or 9 in the evening, slight ruffles set in from various points of the compass at the head of the bay, which continue till sun rise, when they become stronger, and blow from N. and N.E.

(81.) Rio Janeiro, by Capt. Mouchez,—The *seasons*, as is frequently the case within the tropics, are not well marked at Rio Janeiro, and to this cause must be attributed the great diversity of opinions expressed by different authors. Travellers too frequently, judging from their own experience acquired during a few days sojourn. and the few particulars acquired during the same period, are apt to generalize, and these opinions once expressed are then taken as authoritative. It will be better to base our conclusions on the exact figures acquired at the Observatory at Rio. This study of the climate of Rio and of Brasil in general becomes of more interest now that the yellow fever so often visits this country, and it would be important to determine whether there is any connexion between the climatic changes and the appearance of this scourge.

(82.) *Winds.*—In respect of wind, the climate of Rio divides the year into the northerly monsoon and the southerly monsoon. The first includes the autumn and winter (March, April, May, June, July, and August), and the second the remaining six months of the spring and summer.

(83.) During the southerly monsoon, the winds vary between S.S.E. and E.S.E., with frequent squalls from S. and S.W., which are the tails of the pamperos blowing on the shores of the La Plata, and either dying away or changing their direction before reaching the high mountains of the coast of Rio. They rarely have much strength when they reach the roadstead.

During the northerly monsoon the winds are from N.N.E. and E.N.E. To the South of Rio the seasons are still more contracted; they are less from the N.

(84.) The following abstract of the winds experienced at Rio is extracted from the work of Rear-Admiral de Chabannes, French I.N. It is arranged in a tabular form. This table shows the frequency of winds blowing from the sixteen chief points of the compass, and the calms. *Each of the figures represents the proportion per cent. of all the observations made during the month*, each horizontal line forming a total of 100.

It will be seen that southerly winds are most frequent in May and June, 17 in each 100, and northerly winds in January, 19 per cent. Calms are pretty nearly distributed over the whole year, from 25 to 30 per cent.

TABLE *of the* WINDS *and* CALMS *in the Road of Rio Janeiro, for each Month, showing the proportion per cent.*

	N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	Calms.	Total.
January ..	19	3	6	0	1	1	4	2	13	1	2	1	1	0	9	7	27	100
February ..	19	3	5	0	0	4	5	3	13	2	5	0	1	1	6	9	27	100
March	16	5	5	0	0	3	1	2	9	0	6	0	4	1	8	9	29	100
April	14	2	9	0	6	0	4	3	11	1	7	0	2	0	6	11	24	100
May	13	5	6	1	2	0	5	3	17	2	4	0	2	0	7	7	26	100
June	7	4	8	1	2	0	6	3	17	1	3	0	1	0	6	2	30	100
July	10	3	6	0	2	2	7	5	14	4	5	0	0	0	7	5	30	100
August	11	4	8	0	4	0	5	5	11	3	3	1	3	0	6	9	23	100
September..	14	6	10	1	3	0	4	4	7	3	4	1	2	1	6	7	26	100
October....	15	5	11	2	1	0	4	3	6	2	3	2	4	0	6	9	27	100
November..	14	6	12	2	3	0	5	2	4	0	2	0	3	0	8	13	26	100
December ..	14	7	8	2	3	2	3	5	7	4	4	0	2	1	8	2	30	100
Mean for the Year	14	5	8	1	2	1	5	3	10	2	4	0	2	0	7	8	27	100

(85.) VIRACAO, or the land and sea breezes, as has been before stated, the chief feature of the winds at Rio, is the change from the land to the sea breeze. During the night and in the morning the variable winds which come from the surrounding mountains are felt to 2 or 3 leagues from the coast. They vary according to the locality between N.E. and N.W., and are sometimes very fresh; they lull in the morning, and it becomes calm about 10ʰ. About 11ʰ or 11½ʰ the sea breeze enters the bay, as is seen by the ripples on the sea: it increases in force in the afternoon, and falls calm at sunset. These changes are called the Viraçao, and occur at all times, but in bad weather.

These diurnal variations are felt for some miles off the coast, and their constancy greatly facilitates navigation, and regulates the times of entering and departure of ships.

(86.) *Storms.*—Bad weather and heavy winds are extremely rare at Rio. Hurricanes are almost unknown, but gales and squalls always very sudden, and of short duration, are sometimes very violent. The memory is still very fresh of that which occurred on June 12, 1817, which only lasted 20 minutes, but which was so violent that 220 people perished in the roads in boats, overtaken by the squall. It is in summer, January and February, that they are most frequent, the monthly average of days on which thunder occurs in this season is 5. The mean annual number of days on which storms occur during the six years was 21, a number very far inferior to what is usually stated.

(87.) It is generally after a hot day, about the time of sun-set, that they set in, and they frequently bring a deluge of rain, which changes the city into a lake, covering it to the depth of 1 or 2 feet in water.

The storms usually commence in the N.W. of the roadstead, and pass toward the Organ Mountains, when they come up to N.E., the sea breeze, which gradually sinks, and then suddenly it bursts from N.E. or N., the gale then breaks with all its violence on the road.

If the clouds begin to collect on the chain of the Organ Mountains with northerly winds, the storm will be of still greater violence, but this occurs but rarely.

(88.) Winds which bring rain come from the S., S.S.W., S.W. or W.S.W. In rainy weather, if the wind shifts from S.W. to W. and to N., it will continue bad, but if it turns by S.E. and E. it will become fine, which accords generally with the law of gyration in the Southern Hemisphere. The summits of Tijuca serve the inhabitants of Rio as a weather guide; if they are covered with clouds, it is nearly a certain sign of rain, particularly in May, June, July, and August.

(89.) *Rain.*—The year is generally divided into two seasons, the wet and the dry, the latter comprehends the months between April and September, the second the remaining six months. But this rule has many exceptions, which accounts for the diversity of opinion recorded on the subject. For if the storms of summer bring sudden and inundating rains, it occurs frequently that the pamperos or southerly winds of winter so cool the air and cause rain of longer duration, and consequently of greater quantity. In autumn and winter the rain often lasts a very long time; in 1811 it fell incessantly for one hundred days, causing great troubles in the city. The month of August is the mean period for the most abundant rain fall. The quantity of rain varied, during six years observation, between 51 inches in 1855, and 32·5 inches in 1853, average 42·5 inches. In the dry season abundant dews replace the rain and support vegetation.

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3. Winds on the Coast of Africa.

(90.) In the preliminary part of this section sufficient has been said to show that the influence of the large continents of Africa and America is very great in deflecting the normal direction of the trade winds, and in causing an undue expansion of the intervening space of calms which separate the northern and southern systems, and this is especially apparent on the African side.

(91.) In the ensuing remarks we shall give the deductions and remarks of different writers, referring generally to special sections of the coast, as has been done in the case of the Brasil wind systems, and prefix to these the valuable essay by Lieutenant Brito de Capello, whose remarks on the relative force of the winds in the Atlantic have been given on pages 42 to 48, and therefore what follows may be considered as supplementary to that portion of this work. It is illustrated by the diagrams of the arrangement of the winds and calms in the respective seasons, which by the aid of the verbal descriptions which follow, will give a clear insight into the very peculiar features of the meteorology of the central portion of the Atlantic Ocean.

(92.) Lieutenant Brito de Capello has derived his data from the rigid investigation of a large number of logs of ships of war and merchant vessels, sailing between Lisbon and the Portuguese settlements at Angola, Benguella, and the Bight of Biafra, routes which are specially adapted to develope the peculiarities of the complicated wind and current systems necessarily traversed. Added to these are a number of logs sent to him by Mr. Andrau, director of the most useful Netherlandish Meteorological Institute at Utrecht.

(93.) *December, January, and February.*—During these three months the N.E. trade winds are proceeding southwards, and attain their southernmost limit in February and March. In general the wind is stronger, according as the distance from the African coast is increased, and its direction is greatly modified as it is neared; it then comes to be a N.N.W. or N.W. wind.

The force of the wind also diminishes gradually as the southern limit is approached. It decreases until it is lost in the region of calms and variable breezes in such a manner that the southern edge of the N.E. trade is not parallel to the equator, but is nearly in an E.N.E. direction. In December this line is found in 28° W., in lat. 6°

N., and reaches the African coast in 11° N. In January the southern edge has already gone far to the South, and runs from 5° N. in the same meridian towards the coast in 9° or 10° N. In February this line runs from 3° 30′ N., and reaches the coast in 8° N.

(94.) *Zone of Calms.*—Between the N.E. and the S.E. trade winds, at this period of the year, there is a large space of a triangular form, the base of which rests on the African coast, and entirely occupies the space between the trade winds, and shifts its form and position with the progress of the season.

In December this calm zone seems to be bounded on the South by a line running from 28° W. and 4° N. to 3° N. on the meridian of Cape Palmas. The S.E. trade wind blows to the South of this line, but they are usually very light, and come from the S. and S.W. to the East of the 20° meridian. This area is occupied by winds so feeble and variable, that a vessel could not make more than 1·1 to 2·5 miles an hour, and frequently calms are encountered which last for 8, 16, or 24 hours, which are interrupted by storms of rain and wind, generally coming from N.E. to S.E.

In January this calm zone is rather narrower, because its southern edge is more inclined to the North than the northern, running from Cape Palmas to 2° or 3° N. on the meridian of 28° W.

In February these calms are still narrower, their lower edge runs from Cape Palmas to the meridian of 24° W., between 1° and 2° N. The rate of sailing is greater at this time than in the two preceding months, being generally above 2 miles an hour and storms are more frequent.

In the calm zone, during these months, variable breezes predominate, and come from N.E. and N.W. quarters in a band parallel to its northern edge; from the N.W. quarter, on the African side, and from the N.E. on the opposite side; near its southern part, the variable breezes are frequently from the S.E. and S.W., from the latter direction when nearest to the African coast.

The region of the S.E. trades is to the southward of the zone of calms, but their direction for a great portion of their extent on the African coast is much modified; they haul to the S., to S.S.W., and to S.W. near the land. The area of the S.E. trades, properly so called, may be considered as limited to the port lying westward of a line intersecting the equator at 14° or 16° W., passing through the meridian of Greenwich at 7° S., and through 3° or 4° N. in long. 16° W.

To the East of this line the wind generally blows from the S. and S.W. During the month of December, it is very feeble in all the Gulf of Guinea, chiefly on approaching the coast, when it is accompanied by storms coming generally from N.E. quarters. In January, in this part, the wind is fresher, and still more so in February. Storms are more frequent in this latter month.

(95.) *March and April.*—In these two months the position of the different wind systems may be considered as stationary, and analagous to those found in February.

In March the southern limits of the N.E. trades are very nearly the same as in the preceding month. Between the meridians of 22° and 24° W., between the parallel of 14° N. to its southern edge, it blows from the northward or more exactly from N.N.W. to N.N.E. To the eastward of the meridian of 18° W. it blows from the N.W., veering to W.N.W. near the coast; to the West of 20° W. the wind is N.N.E., then N.E., and further on more easterly and more fresh.

In April the strength and direction of the N.E. trades are very similar to those of the preceding month; the mean southern limit seems to commence its retrograde movement; from the parallel of 4° 30′ N. on the meridian of 28° W., it runs towards the African coast, where it is met with in about 10° N.

In March the zone of calms is little different from February, but its southern edge is farther South; it follows the parallel of 1° N. in 22° W., and thence reaches Cape Palmas. But calms predominate more to the westward of the meridian of 19° W.;

on the land side light airs and variable S.W. breezes are met with. Storms are still frequent, and come from various quarters.

In the month of April the calm zone is a little farther from the equator. Its mean northern limit is rather more North, and its southern edge is about one degree farther northward, being met with in 20° N., and about longitude 28° W., from whence it passes towards Cape Palmas. In this calm space storms are not so frequent as in the preceding month. A line passing through 18° W. and 2° N., the equator and 12° W., and through 5° W. between 4° and 5° S., seems to separate the true S.E. trades from the winds attracted toward the East by the effects of the African continent. Storms and calms are still frequent, particularly in March, and they extend considerably to the equator.

(96.) *May* and *June.*—At this period the two trade winds shift their position. The mean line separating them is removed nearly 6° in latitude in a parallel direction. The space occupied by the N.E. trade is then very narrow, and its strength is sensibly diminished, although its general direction remains unchanged.

In May the line of separation between the N.E. trades and the calm zone passes from 6° N. on the meridian of 28° W. towards 11° N. on the African coast, so that it has travelled 90 miles northward since the preceding month, or at the rate of 3 miles per day.

In June this line is much farther to the northward, and it is fully 3° farther North, its rate of progress being at least 6 miles per day. In the narrow space occupied by the N.E. trade wind, its force, as may be conceived, is much lessened, and its direction is more westerly near the land.

In May the line separating the S.E. trades and the calm zone, seems to go from 3° N. and 28° W. toward the African coast in 5° or 6° N. Calms are less frequent than in April, and between the meridian of 20° W. and the African coast, although they are more or less from the S.W and light, it shows clearly that the S,W. monsoon has set in, at least in 7° North.

In June a line drawn from 5° N. and 28° W. to the African coast, in 7° or 8° N., will separate the two regions. The S.W. monsoon seems to be well established, and also in the calm spaces East of the meridian of 24° W. the winds are light, and come more from the S.W. in the southern part, and from the West and N.W. in the northern part. During these two months storms are much less frequent than in the preceding periods; but by way of compensation it is the season for hurricanes on all the coast from Cape Palmas northward.

A line which cuts the meridian of 14° W. in 2° N., the equator in 9° W. and 4° 40′ W. or 2° S. seems to separate the S.E. trades properly so called from the southerly and S.S.W. winds. In May the S.E. trades are fresher than in June.

(97.) *July, August,* and *September.* This is the period when the S.W. monsoon is fully developed, the calms of the preceding periods are replaced by S.W. winds, more or less fresh and irregular, accompanied by heavy rains, and leaving only a zone of 2° or 3° breadth between the N.E. trades and the S.W. monsoon, on which calms and variable breezes still prevail.

In July there is a small space on which the N.E. trade blows; its southern edge lies in an E.N.E. direction, passing through 12° N. in long. 28° W. This line continues to advance northward at nearly the same rate as in the preceding month. From July to August it still continues moving northward, though much slower. In the latter months the southern limit of the N.E. trades is found to the North of the parallel of 14° N. The line separating the S.E. trades from the S.W. monsoon cuts the equator in 10° W. and the meridian of 4° 40′ W. in 5° S. At this period, especially in the two last months, the S.E. trades as well as the S.W. monsoon, and the S.S.W. winds in the Gulf of Guinea, are generally fresh; near the coast of Angola, at this period the winds are light, more so than at any other period of the year.

(98.) *October* and *November*. In October the N.E. trade winds have already advanced southward; their southern edge is in 10° N. in 28° W. and in 14° N. on the Coast of Africa, very nearly as in June. In November their southern edge has advanced 3° southward. In October the region of the S.W. monsoon has much contracted, and has much decreased in force; on the other hand the zone of calms and variable breezes has extended still farther, and now has a breadth of more than 4° beyond the southern edge of the N.E. trades. To the South of this space of calms, beyond the meridians of 22° or 24° W. going towards the land, the S.W. monsoon is encountered; the S.E. trades blow to the West of these meridians.

In November the region of calms and variables may be considered to comprise all the triangular space between the N.E. trades and the parallel of 4° N. to the coast of Africa. In this month the sailing rate is even less than in December, and in many parts there is not wind enough to command a greater speed than between 1 and 1½ knots per hour.

The S.E. trades, like the S.W. winds near the land, are brisk at this period; on the Angola and Congo coasts the wind generally comes from S.W. to W.S.W., and is fresher than at any other part of the year.

The line which separates the S.E. trade winds from those deflected by the action of the land passes through 4° N. on the meridian of 22° W. through the equator in 12° W., and through 5° S. in 4° 43′ W.

(99.) The following observations by Captain Midgley will be found of great service, in addition to those just given by Lieut. de Capello.

I have generally found the limits of the N.E. and S.E. trades accurately described in the Table published in the Memoir of the Atlantic Ocean; and add my humble testimony to the accuracy of the remarks on the African Currents by the late learned and respected Major Rennell. The third section of the Observations on Currents in the North Atlantic Memoir, should be carefully studied *and acted upon* by every prudent mariner bound to the Bights of Benin or Biafra, or indeed to any part of the windward coast; it is an accurate and valuable account of the Guinea current, and may be considered as an unerring monitor, which warns the mariner against its treacherous influence; for when this current runs with its greatest strength, the weather is so wet and squally, that observations cannot often be had, sometimes not for days together.

I will here offer a few remarks on the general variable winds and weather which prevail between the parallels of 4° and 10° North, and the meridians of 18° and 25° West, or between the N.E. and S.E. trade winds.

The winds generally incline from the southward, between the trades, and few vessels pass from one trade wind to the other without meeting with very unpleasant weather, in the shape of calms, light baffling winds, squalls, and rain, particularly when the sun is much to the northward.

In June, July, and August, heavy squalls seem to prevail from the S.W., with a great deal of rain, and the wind often blows hard from this quarter for several hours together, and then falls calm, leaving a heavy and confused short sea, which causes a vessel to labour and strain more than she would do in a gale of wind.

When the sun is far to the southward, the weather is comparatively fine, with light southerly and S.E. winds, occasionally, however, interrupted by squalls and rain; and the calms are of shorter duration, owing, probably, to the limited breadth of the space between the trade winds at this season.

In this part of the ocean, when much lightning is seen in a heavy dense cloud, in any quarter of the compass, the wind may be expected to come out suddenly from that quarter, especially if there is any rain, even though the wind may be blowing at the same time with moderate force from an opposite quarter.

Forked or chain lightning is the almost sure forerunner of a heavy squall; it is a monitor whose warning should not be neglected.*

Whenever there is much lightning, and the wind is unsteady and baffling about, prepare for a change. A heavy dense cloud, having a squally appearance, may rise and pass slowly over the vessel directly to leeward, with perhaps little or no increase of wind; and when the danger may be supposed over, the vessel is suddenly taken aback with a smart squall. This, I presume, arises from the cloud which has just gone over the ship, being opposed in its progress to leeward by a stronger current of air from the opposite quarter. On this account, when clouds are in motion from opposite quarters of the compass, a better look-out, if possible, should be kept to leeward than to windward.

Keeping a good look-out upon the surface of the water is an excellent method of judging of the force of wind in an approaching squall; but on account of the heavy rain which invariably accompanies the squalls alluded to, very little sound judgment can be exercised with respect to their strength; they are generally, however, tolerably heavy, and require sail to be considerably reduced.

In June, July, and August, the weather is very wet and squally. Sometimes dense masses of clouds are seen in rapid motion from the S.E., southward, and S.W. quarters of the horizon: these clouds have a bulky and confused appearance, as if tumbling or rolling over each other; are of a dirty, dark drab colour, with ragged edges, and inky-looking small clouds flying about the edges of them. In their approach towards the zenith they gradually appear to unite and form the apex of an angle, and thus united blow with incredible violence from the S.W. quarter (veering about two or three points or more) for upwards of two hours, during which time the rain descends in torrents, perhaps accompanied by a waterspout or whirlwind.

Ships should be well prepared for these dangerous visitors, for they come with a similar violence to the arched white squall of the West Indies. I have experienced two squalls of the above description (both in the month of July), and in one of them lost a good fore-topsail, after the reef-tackles, &c., were hauled out snug, and the ship had been for some time running directly before the wind. Upon both occasions my barometer fell three-tenths of an inch very suddenly, which enabled me to take in sail in time; for the squalls did not look particularly alarming until about eight or ten minutes before they reached the ship.

To the inexperienced in this part of the ocean, I would beg to remark, that *much* sheet lightning is always suspicious, and forked or chain lightning universally so; and the latter is, in some degree, indicative of a change, as well as of an increase of wind.

After the wind has blown steadily, with fine weather for a few hours, and it then begins to be variable, and fly suddenly about, squalls and rain may be expected.

The moon has great influence on the weather; for it is mostly squally and unsettled, with much rain, about the full and change.

I perfectly agree with Captain Cheveley, that the month of July is perhaps the worst in the year for making southing between the trades. I have made two homeward passages in July between the meridians of 22° and 26° West, and met upon each occasion with the same weather as described by that gentleman; namely, strong S.W. winds, hard squalls, and torrents of rain, with a heavy short sea, and northerly currents.

(100.) SEASONS.—On the WINDWARD COAST, from January until May, the weather is commonly fair and clear, with cooling breezes and gentle westerly winds. But about the middle of May the South and south-east winds begin, accompanied, not only with hurricanes and stormy gusts, but also with thunder, lightning, and great rains, which vary, more or less, until January, as shown in the following description.

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* In those parts of the North Atlantic Ocean which are not in the general influence of the trades, I have very frequently remarked that lightning is indicative of a change of wind.

The Baron Roussin says that on the whole extent of the African coast there are but two seasons, namely, the rainy and dry seasons. The division of the two is connected with the periods when the sun crosses from one hemisphere to the other, and is modified as he advances to, or recedes from, the equator.

The Rainy Season.—The rainy season commences at each place on the coast to the northward of the equator, at the time when the sun passes the zenith of that place in his course to the northward. It is usually during the months preceding this event that the change of weather takes places. It may, therefore, be calculated that, at the Isles de Los, which lie in 9½° N., the first violent squalls do not occur before the 10th or 15th of May; their arrival seems to be affected by the moon; for they almost always commence, and are most violent on the days of new and full.*

(101.) Lieutenant Bold also says, that the winds and weather on all parts of the windward coast are much alike, excepting that the rains commence rather earlier in the S.E. The wintry season makes its appearance early in June, by strong breezes and occasional heavy gusts from the southward and S.E. accompanied with rains, that increase violently and continue until the latter end of August; this is succeeded by a series of close foggy weather, during which the land appears enveloped in vapour, occasioned by exhalations from the humid land. This is justly considered to be the most pernicious season in the year to the European constitution; the whole atmosphere being then impregnated with deleterious matter, generated by decayed vegetation. During the rains there are no land winds, neither in the month of October, when the wind is strong *down* the coast, and in the following month gradually draws down to the South and westward, with occasional rain: toward the middle of December the weather begins to clear up, and the summer season to make its appearance; this continues until June, with a beautiful clear sky and gentle refreshing breezes from the S.S.W., during the last ten or twelve weeks of which the tornadoes prevail very violently; but these come on generally in the evening, and give ample warning to the navigator to prepare against this dreadful impetuosity.

The same intelligent navigator adds:—The seasons on the Gold Coast are precisely similar to those of the Windward Coast, with the exception of their successively commencing a month earlier. Along the coast, in the winter season, when the winds are from the S.W. the swell and surf on the beach are excessively high, and too dangerous in many parts to permit landing.

The seasons on the coast of Dahomey, &c., are nearly similar to those of the Gold Coast; the rains commencing in May, which are preceded by the tornadoes and equally boisterous weather, wither, with southerly and S.S.E. winds from the month of March, causing a heavy sea in the Bight, with a violent surf along shore. The finest months here are from September to March, during which the winds are from W.N.W. to W.S.W., with cool refreshing breezes by day, and land winds at night. But it is to be observed that, in the rough season and the winter months, there are no land winds, and the current is frequently found running rapidly to windward.

The Tornado derives its appellation from the Portuguese, signifying a whirlwind It is known on all the coast of Africa, between the Rio Nunez, in lat. 10½° N. and the equator, but is most severely felt on the Windward Coast, and seems intended by Divine Providence to expel the noxious matter with which the air is so frequently charged. The tornado first announces itself by the appearance of a small silvery cloud in the zenith, which gradually increases and descends towards the horizon and becomes veiled over with the most impenetrable darkness: at this moment the functions of nature seem to be paralyzed, and the elements to have ceased their operations; the most profound and solemn stillness reigns around, with scarcely a breath of air from the heavens, in consequence of which the whole physical system feels oppressed with sensations of approaching suffocation; violent and reverberated peals of distant thunder and lightning commence, gradually advancing and increasing to an extreme not easy to describe; the atmosphere being, at times, in a continued blaze for minutes, without intermission: at length the gust arrives with sometimes the greatest irresistible violence, the impulse of which no sails can frequently withstand. It is fortunately not of long duration, extending from one to three hours, and concludes with a furious deluge of rain, that descends rather in columns than in drops. The great danger is in the sudden impulse of the gust, which would immediately dismast or overturn a vessel unprepared for the event. Nothing can be more exquisitely delightful than the subsequent clear and pure state of the air, creating an apparent regeneration of the animal as well as of the vegetable world.

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* Captain Adams, in his SKETCHES, says the wet season, North of the equator, commences in the month of May, and terminates in July, when the dry begins; although heavy showers of rain fell during the months of October and November, which enable the Africans to reap a second harvest of maize; but the rains commence and terminate six weeks earlier near the equator than at the northern boundary, where the periodical rains cease.

Between *Cape Mount* and *Cape Mesurado*, as well as upon the coast westward, between *Cape Mount* and *Cape St. Anne*, the rains begin with May, and continue till October, accompanied with great thunder and lightning, and furious gusts of wind from the north-westward. During this time the sea sets so hard to the N.E. along the coast, and with mountainous billows, that it is impossible to approach the shore; so that ships which, between July and September, happen to fall below Cape Mount, cannot, without great difficulty, get about to the South.

(102.) On the Gold Coast, between the rivers Assinee and Volta, the seasons are very nearly the same as on the Grain Coast. In January the wind begins to blow hard from the S.W. quarter, and becomes stronger in February, bringing with it sometimes rain, and sometimes a hurricane. About the and of March and beginning of April those heavy tempests, commonly called the *tornadoes*, arise, accompanied with a deluge of rain, thunder, lightning, and sometimes with earthquakes; these continued to the end of May, and are announced by the darkness of the sky in the S.E.

During the rainy season, that is in May and July, few or no land winds are felt: but, from the sea, it blows out of the S W. and W.S.W., making a very great swell, which continues, even in August, though the rains begin to cease in that month.

The weather on the Gold Coast grows fair in September, and the air clear, with gentle South winds; and this continues till January, the hottest days being in December.*

To the southward of the equator the rains on the coast begin to fall in October, and continue till January, but subject to the same variations as North of the equator; the seasons being governed by the earth's place on the ecliptic.

A young officer, in describing the country near the River Bonny, speaks of the climate thus:—Here the sun acts not only upon the body, but upon the mind, also, its influence is great; and none but those who have experienced it can imagine the pleasure of seeing the sun, after its burning course, sink into the cool bed of the ocean.

The burning rays of this part of Africa are possessed of so much power, that braving them in the day time may be considered as an act of insanity; for if a *coup de soleil* does not quickly deprive you of reason enough to know anything about it, you will soon discover that a second walk in the sunshine may save you the necessity of looking after your own affairs, and trouble your next of kin to take charge of your body and estate. All nature seems, in these caloric regions, to feel and look parched and feverish, and I firmly believe that every cat, dog, mouse, tree, shrub, and butterfly—in fact, every member of the animal and vegetable kingdom, looks with as much pleasure upon the daily decrease of the hot luminary as they hail with delight the cool refreshing dews of night, with the cold comfortable looking moon shining, with its round unmeaning face upon the thirsty earth. An Englishman cannot understand a tropical sun; the dog-days of our temperate isle would be refreshing moments to the toasting, stewing, enervating hours of an African purgatory: frequently no breath of air sweeps over the waters to cool your parched skin, or else it comes "like blasts from hell," and you inhale air that almost burns the lungs, so hot and arid is it. With night comes the tempting, but too fatal dews, and a refreshing breeze.

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* For a description of the Harmattan, or temporary easterly wind, which at times prevails in December, January, and February, see "Memoir on the Atlantic Ocean," Section II.

> "The morrow comes when they are not for thee."

(103.) At the Island of St. Thomas, which is situated nearly on the equator, in long. 6½° E., the climate is materially different from that of the Gold Coast; and upon this part of the subject the following remarks of Captain Sabine will be found interesting:—The occasional advance of the cold water of the *Equatorial Current* to the Island of St. Thomas may assist in explaining an apparent peculiarity in the climate of that island, when compared with the climate of the coast of Western Africa generally. At all the British possessions from the Gambia, in lat. 13° N., to the forts on the Gold Coast, June, July, and August are accounted the unhealthy months; whilst at St. Thomas's, on the contrary, they are the most healthy in the year to Europeans, although they are not so to the negroes, who suffer much from colds and rheumatisms during their continuance, It has been shown that the water of the Equatorial Currents is from 10° to 12° colder than that of the Gulf of Guinea, and that its northern border, which, at other seasons, passes the meridian of St. Thomas at a distance of from 120 to 180 miles South of its southern extremity, was found in June in contact, or very nearly so, with the island itself; and it is not improbable, from the consideration of the causes which occasion its advance toward the equator when the sun is in its northern signs, that in July it may extend so far as even to include the whole island of St. Thomas with its limits.

The temperature of the air is known to be immediately dependant on that of the surface water of the sea, and to be influenced nearly to the full extent of any alteration that may take place therein. In crossing the Bight of Biafra, from Cape Formosa to St. Thomas's, the air over the surface of the Guinea Current, observed in the shade and to windward, at sunrise, noon, and sunset, averaged 81½°, the extremes being 79° and 83½°; whilst in the passage from the River Gaboon to Ascension, over the Equatorial Current, the air averaged only 74°, the extremes being from 73½° to 74½°, a part of the passage being, moreover, on the very edge of the two currents, and within sight of St. Thomas's. The vicinity of the Equatorial current, therefore, when the sun is in the northern signs, cannot fail materially to influence the temperature of the island (particularly as the wind is always from the South), and thus to affect its climate. Situated on the equator, St. Thomas has naturally two cold seasons, or winters, in the year, the sun being equally distant in June and in December; but in June, July, and August, is super-added the influence of the surface water of the ocean, several degrees colder than in November, December, and January, rendering the months of June, July, and August, pre-eminently the winter of St. Thomas's in which the natives complain of colds and rheumatism, and the health of Europeans is less affected than at other seasons, because the climate is then less dissimilar than usual to their own.

The comparative unhealthiness of Prince's Island to that of St. Thomas's, and of both to Anno Bon, as the residence of Europeans, has been frequently and particularly noticed by Portuguese authorities, and is universally recognised at Prince's Island, and at St. Thomas's. It may be a sufficient explanation to remark, that Anno Bon is always surrounded by the Equatorial Current; Prince's always by the Guinea Current; and that the position of St. Thomas's is intermediate, and its climate is occasionally influenced by both. In tropical climates a very few degrees of temperature constitute an essential difference in the feelings of the natives, and in the health of Europeans.

(104.) From the circumstances above explained, vessels navigating on the Windward and Gold Coasts will, of course, be accelerated or retarded, according to the season. An able and competent judge of the subject has said "*During the period of the year when land breezes alternate with those of the sea*, the best mode of beating a ship to windward is to get under way as soon as the wind blows steadily from the land, hugging the shore on board as near as may be prudent; for by that means every advantage is derived from it that can be expected. Soon after daylight this wind veers to the West, and lays the ship's head off shore; by eleven a.m. the sea breeze will have acquired its strength and true direction, at which time, also, the vessel will have made a good offing. Tack and stand in-shore, anchoring when in 8 fathoms of water, where it will be proper to wait for the land wind. By adopting this method, a vessel is placed in the best possible situation for taking early advantage of the breeze from the shore; whereas if she were kept under way during the night, the probability is that she would lose all the ground she had gained the preceding day, independently of being placed where the land breeze might not reach her.

During the rains, when the sea breeze blows both in the day and night, and at a few leagues from the shore from very near the South point of the compass, stand off shore for twenty-four hours, when the wind will mostly be found to blow at S.S.W. or S. by W., and often at the South; when the larboard tack on board the vessel will lie up West clean full, and the variation being nearly two points southerly, she will not only make good her course. but southing also.

As the current at this season of the year sets strongly to the eastward, it will be prudent to allow 36 miles in twenty-four hours for its mean velocity; otherwise, in bearing up and making the land, the ship will be found to leeward of her port of destination. This is an error many have fallen into. Perhaps it would be better to allow even 48 miles, because it is easy to run a few leagues to leeward, should the vessel prove to windward of the place to which she is bound.

(105.) The SEASONS of the country forming the BIGHT or BIAFRA have been described by Lieutenant Bold nearly as follow:—Although nature here is apparently in a ceaseless state of verdant vegetation, the seasons vary as sensibly as in more temperate regions, contributing to the decay of old and regeneration of new fruits and plants. The spring commences about November, and the hot months of summer continue until May, during which period the weather is clear and fine, but excessively hot, with occasional tornadoes. From the middle of June the rains gradually increase, and continue in all July and August, descending during the latter in torrents. This period may be considered as the winter, and during it the inhabitants are afflicted with colds, fluxes, fevers, &c. In September, October, and November, the country is entirely enveloped in exhalations, which the natives term the *Smokes*, and which are exceedingly injurious to the European constitution.

It is advisable for those who intend to remain for a season in the *River del Rey* to have a housing over the vessel, in order to preserve the health of the crew, as well as the ship's decks and sides, which will otherwise be materially damaged, by exposure to the sun during so long a period.

(106.) *About the island of* ANNO BON the wind blows with a moderate force, and little variation, from the South and S.W. quarter throughout the year, so that, as ships lie there, under shelter of the land, they ride at anchor exceedingly easy and safe ,and the navigator has little or no danger to apprehend from wind and weather, excepting about the months of March and September, when tornadoes, or strong gusts of wind from the eastward, prevail at times over the general sea breeze, and blow direct into the anchorage; but fortunately, the previous gloominess of the horizon to the eastward, and the heavy thunder and lightning by which they are preceded, always give timely notice to those who have not the ground-tackling requisite for riding them out to get under sail, and withstand their fury in the offing.

In point of salubrity to European visitants this island could scarcely fail of proving superior to any of our settlements on the western coast of Africa, and it is much better suited to the constitution of Europeans than the climate of any other African island situated within the tropics, and at a shorter distance from the continent. It is situated far out of the reach of those pestilential vapours and excessive heavy dews and rains which are so prevalent and so fatal to Europeans, on the coast of the continent, and it does not contain any marshy land nor stagnant waters within its shores.

(107.) RIVER CONGO.—Lieutenant Bold has stated that the seasons, in the vicinity of Congo, are considerably later than those to the northward. *Massanga*, or the season of rains, commences in October, and terminates in January; then *Neasu*, or the harvest months, succeed, and continue until March or April. *Quitomba*, or the tornado season, takes place in May and June; and is followed by *Quibiso*, the dry season, which continues until September, when the river rises considerably.

The WINDS from September to March are most commonly between the South and West, with a rapid current to the North; but from March to the dry season from the S.S.E., at which period the current frequently runs to the S.W. The sea breeze generally sets in toward noon; and it may be observed, that vessels bound along the coast to the southward should invariably beat to seaward, out of the strength of the current, excepting when it should be found weatherly, and at those hours the land winds prevail, which they may stand in-shore to take advantage of.

(108.) At the CAPE of GOOD HOPE.—The division of the year at the Cape may be said to consist of four parts, as in Europe; thus dividing it, the *Spring* which commences at the beginning of September, and continues to the beginning of December, is indisputably the most agreeable season. The *Summer*, from December to March, is sultry, and would be intolerable, if the heat were not mitigated by the winds which blow from the Southern Ocean. The *Autumn*, from March to June, is distinguished by a variety of weather, though generally pleasant toward the end; and the *Winter*, from June to September, is usually cold, rainy, and stormy.

The seasons are also divided into dry and wet; the latter from September to March. The greatest heat is in January and February, when the thermometer sometimes rises to 100°. In the stormy or winter months, June, July, and August, it falls at times to 40°.

On the summit of the Table Mountain the temperature of the air is considerably lower in the clear weather of winter than in Cape Town; and in summer the difference is still greater, when the head of the mountain is enveloped in the fleecy cloud called the *Table Cloth*. The approach of winter is generally indicated by the subsidence of the winds and the disappearance of the cloud. These tokens are succeeded by heavy dews, thick fogs, and cold north-westerly winds, accompanied by violent storms of thunder, lightning, and rain. At the expiration of three days the atmosphere begins to brighten, and then the mountains on the continent appear with their summits covered with snow,

The climate of the Cape appears to be as healthy as any in the world, and no particular diseases belong to it. Here, as everywhere else, coughs are troublesome in the spring, and gout is common among the farmers, a circumstance easily accounted for. The people in general appear ruddy and healthy. In six months of the year 1829 the temperature of the air and sea-water were as follows:—In July, air 58°, water 57°; August, air 54°, water the same; September, air 60°, water 56°; October, air 59°, water 55°; November, air 62°, water 57°; December, air 68°, water 58°.

The prevailing winds here are from S.E. and N.W. Others seldom last longer than a few hours. The East and N.E. are less than any. The North and N.W. commonly blow in hurricanes, and bring on foul weather. The S.E. winds blow, more or less, in almost all the months of the year, but chiefly in the fair weather season, from October to April; then you generally have, in the mornings, regular sea breezes from S.W. and West, which last till noon, and sometimes longer; they are followed by a S.E. and E.S.E. wind, coming off the land; this mostly blows fresh the remaining part of the day, and frequently all night, when the sea breeze comes off again. In the months of May, June, July, and August, the West and S.W. winds blow strong, being frequently accompanied with fogs and cloudy weather, but they are soon ever. Sometimes violent N.W. winds prevail for several days together, and by fits in the other months; the sky at this time is constantly clouded, and they generally end in rain.

Mr. Webster, in his narrative of the voyage of the *Chanticleer*, has observed that "On the eastern side of the Cape of Good Hope we find the sea breezes strong, and blowing home upon the coast; there the sea breeze coincides, in direction, with the trade wind. On approaching the southern line of the Cape, the tendency of the wind to blow from the S.E., or a cool quarter, still continues, as the causes remain the same; but on rounding the Cape to the westward the wind is found to veer gradually to the southward, and become S.W., because the S.E. is no longer the cool quarter to that part of the coast; and to some distance off shore, perhaps 100 miles or more, the S.E. trade cannot blow, for the cool quarter there is the S.W. Here the wind is light. But as we draw off shore, the S.E. wind begins to prevail, and in the open ocean is uninterrupted. On the western coast of Africa, generally within 100 or 200 miles from the coast, the cool air from the ocean rushes in, and counteracts the trade wind. It is, therefore, obvious that the western coasts of a continent within the tropics have different winds from the eastern. The eastern coast of South America has the S.E. winds blowing strong as far as Monte Video in the summer time; but the western coasts do not present the same extent of heated surface as those of Africa, on account of the chain of mountains which extend parallel to the coast, and in consequence there are not westerly but southerly winds on that coast."

(109.) INDICATIONS OF WIND.—It has been stated that sometimes such swarms of flies are blown off the coast about the entrance of the Rio Plata, as to resemble a small dense black cloud, which is invariably followed by one of the gales or hurricanes denominated *pamperos*, from blowing over the extensive Pampas or plains.

In the Eastern Seas swarms of large flies sometimes come on board vessels, and a typhoon is sure to follow. An eye witness said, "There were three Indiamen of us in company; typhoon flies flew on board our ship, the weather was very fine, and no appearance of a gale, and all of us were surprised when our old experienced captain immediately set us to work to send down royals, topgallant-masts, &c., which we had scarcely accomplished, when a tremendous hurricane came on. We were obliged to keep the ship right before it for a long time. When it came on, our commander was on the forecastle, giving some orders, and the force of the wind was such that he was unable to return to the quarter-deck for about four hours.

"The other ships suffered severely, losing topmasts, &c., but we escaped, owing to the experience of our captain, and his prudent measures, which commenced as soon as ever the flies were noticed."

Mr. Luccock says, In the latitude of 34° South, and fully 200 miles from land, we found the rigging covered one morning with a multitude of small insects, some of them very beautiful. We had no doubt of their being brought from the land by a N.W. wind, which then began to blow fresh, but wondered at the distance to which they had been wafted. They were the precursors of one of the most durable gales which I ever experienced: it lasted ten days, with more or less violence, during which we drifted to 36½° South.—*Luccock's Brasil.*

(110.) On this subject Mr. Darwin says, "Several times when the ship has been some miles off the mouth of the Plata, and at other times when off the shores of Northern Patagonia, we have been surrounded by insects. One evening, when we were about 10 miles from the Bay of San Blas, vast numbers of butterflies, in bands or flocks of countless myriads, extended as far as the eye could range. Even by the aid of a glass it was not possible to see a space free from butterflies. The seamen cried out, 'It was snowing butterflies;' and such in fact was the appearance. More species than one were present, but the main part belonged to a kind very similar to, but not identical with, the common English *Colias edusa.* Some moths and hymenoptera accompanied the butterflies, and a fine Calosoma flew on board. Other instances are known of this beetle having been caught far out at sea; and this is the more remarkable, as the greater number of the Carabidæ seldom or never take wing. The day had been fine and calm, and the one previous to it equally so, with light variable airs. Hence we cannot suppose that the insects were blown off the land, but we must conclude that they voluntarily took flight. Before sunset, a strong breeze sprung up from the North, and this must have been the cause of tens of thousands of the butterflies and other insects having perished. The most remarkable instance I ever knew of an insect being caught far from land, was that of a large grasshopper (*Acrydium*), which flew on board, when the *Beagle* was to windward of the Cape Verde Islands, and when the nearest point of land, not directly opposed to the trade wind, was Cape Blanco on the coast of Africa, 370 miles distant.

"On several occasions, when the vessel has been within the mouth of the Plata, the rigging has been coated with the web of the gossamer spider. One day (November 1st, 1832), I paid particular attention to the phenomenon. The weather had been fine and clear, and in the morning the air was full of patches of the flocculent web, as on an autumnal day in England. The ship was sixty miles distant from the land, in the direction of a steady though light breeze." *

4. Winds and Calms near the Tropic of Capricorn.

(111.) The south-east trade wind is separated from the anti-trade winds by a belt the character of which is difficult to define. The analogous belt in the North Atlantic is sometimes called the "horse latitudes," from the bad weather encountered in it causing the necessity of throwing overboard horses which were being carried to the West Indies. This character will be hardly borne out by the term *calms* of Capricorn or Cancer, applied to them.

(112.) In the South Atlantic there is this important distinction in the amount of our knowledge respecting it,—that while, in the North Atlantic, it is traversed frequently by vessels throughout its whole extent, in the numerous passages made between the northern and southern ports of Europe and America and the West Indies, in the South Atlantic it is only well known on the two sides of the ocean, or those traversed on the outward and homeward passages around the Cape of Good Hope or Cape Horn. There is no intermediate traffic across the South Atlantic. Our information as to the central portion is therefore less complete, but also of less importance.

(113.) In a former page (35) is given the opinion of Captain Maury, that this belt is the line of junction of the upper but contrary currents which pass over the trade and anti-trade winds, and here descend to the surface and feed those winds by continuing their course as lower strata. This reasoning is borne out in some degree by the observations of Captain Toynbee, given on page 49, and some of its physical characteristics are there given.

(114.) From its nature, it can scarcely be termed a region of calms, and this is more especially the case on its eastern side. The breadth of the belt is much greater on the Brasilian side than on the African, for the S.E. trade wind in the South Atlantic seems to be analogous to those in the Indian and Pacific Oceans. It loses its force and regularity on the S.W. portion of its area. Thus, in the Indian Ocean there is a considerable space of baffling uncertain winds to the East and E.S.E. of Madagascar, and on the coast of Brasil, North of the Rio Plata, there is apparently a similar region, apparently under the influence of the land, which disturbs the normal current.

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* Voyages of the *Adventure* and *Beagle*, Vol. III. p. 185.

(115.) The question as to the mode in which the wind changes from the western anti-trade to the S.E. trade is of some importance to be understood, inasmuch as a certain knowledge would enable us to say whether those gales which at times, and especially near the Cape of Good Hope, are of the character of the true cyclone, formed by opposing currents of air from contrary directions, or only those variations in direction as well as force which would naturally arise if the one passes directly into the other. As before stated, Captain Toynbee's experience would lead to the inference that there are upper and opposing currents, which here contend for the mastery previous to assuming a new direction on the surface of the earth.

(116.) Such too is the argument in some measure held by M. Bridet, director of the observatory at the island of Réunion, who has argued that the rotary gales or cyclones, which are believed to be encountered as far as lat. 35° to 40° S., are derived from those true cyclones which commence in the northern margin of the trade wind. These describe, at a great elevation in the atmosphere, the first branch of their parabola; and descending to the surface of the globe between 30° and 35° S. towards the southern limit of the trade wind, the second branch of this parabola. These cyclones turn from left to right, like all others in the southern hemisphere, but with an angular velocity less than that of cyclones of the torrid zone. Their centre, however, has a greater rate of translation than the cyclones of the torrid zone, and their path is directed from W.N.W. to E.S.E. or thereabout in the neighbourhood of the Cape of Good Hope, and between the parallels of 35° and 40°, having on their left hand, or North side, the dangerous semicircle and the right or South side of the cyclone that which has moderate winds.

(117.) This question has been more fully gone into in our Directory for the Indian Ocean, pages 4—9. It is more important in that ocean, as ships have to make their passages across it, in a higher latitude and much more in an easterly and westerly direction than is done to the West of the Cape of Good Hope. In this passage it is of importance to keep on that edge of the cyclone, which affords a favourable wind, and in sailing eastward this may perhaps be found on the parallel of 39°, and not more southward, as was experienced by Captain Erskine in H.M.S. *Havannah*.

(118.) During the southern summer the S.E. trade extends as far South as the Cape of Good Hope, or during the period from September to April the predominant wind is from S.E., especially so in January, February, and March, and the limit on this coast, which is of course very important to the navigation around it, varies with the progress of the sun, as the N.W. and westerly winds of this intervening belt of the tropic of Capricorn commence in April, and in May hard gales occur between N.W. and S.W. They are strongest in June, July, and August, raising a very heavy sea. These prevalent westerly winds (the anti-trades) last till October, and are experienced for 100 miles off the coast. They bring rain with thunder and lightning.

(119.) One important remark is that the barometer *rises* with southerly winds, and *falls* with those from the northward. The gales most to be dreaded are those which are preceded by heavy black clouds, rising from the N.W, and West, sometimes with lightning. The old Dutch commanders were directed by the East India Company to wear and shorten sail when this occurred, as a heavy gale was expected from that quarter. When the wind at S.E. or E.S.E. shifted to N.E., they were directed to take in the main-sail. These hard gales are to be guarded against, especially in the winter, between the Cape Bank and the South end of Madagascar.

(120.) During the southern winter, the great westerly aerial current reaches the southern point of the African continent, and attains its greatest force, on account of the obstacle that the land presents. It divides near the Cape into two branches; the one turning to the left blows up the western coast of Africa; the other turns to the right, and follows the southern coast to the East of Agulhas.

(121.) By supposing this current blowing from the W.S.W. to E.N.E., and the line of division being some distance to the North of the Cape, it will explain how that strong N.W. winds will occur in Table Bay, and at the same time that a fresh breeze from the S.E. is blowing at only 60 leagues to the N.W. of the Cape. The oscillations of this parting line will also explain the sudden shifts of wind encountered in its neighbourhood.

(122.) The varying of the winds, then, in the neighbourhood of the Cape of Good Hope, will be a good guide as to the southern limit of the trade wind, and of the position of the belt separating it from the anti-trades, which vibrates with the progress of the sun about its latitude. But it by no means follows that the space in question should be occupied by variable or light winds, for it has been argued and demonstrated, that at times the westerly winds gradually assume a S.W., then South, and at last a S.E. direction, without much diminution of force. And this is especially the case near the Cape, for it is frequently found that on gaining a good offing to the westward, the steady S.E. wind is encountered and may be carried up to the line on the usual homeward route.

(123.) On the American side this belt of uncertain winds is broader, and its limits are more variable than on the eastern side of the South Atlantic. It is in this respect analogous to what has been observed in the Indian Ocean, as before mentioned. In January or February, when it is at its northernmost point, it may be encountered when near Trinidad and the Abrolhos, lat. 20°, and if going round the Horn, the true westerly anti-trades may not be met with till in lat. 35°. In August these limits may be respectively 15° and 30°. But, as has been said before, the land influences are very powerful here, and therefore the remarks on the winds on the Brasilian coast must be considered to relate to what occurs more or less in the open ocean. Further than this the illustration must give the required information. Of course, the lines there given as defining the boundaries of the calm and wind regions are necessarily very vague, in many cases derived from very insufficient data, and in reality fix a limit to what cannot be bounded except by opinion.

(124.) River Plata.—This portion of the American coast is within the limits of this changing belt of winds, and therefore the ensuing remarks are applicable to this section. The climate of Monte Video is temperate, but fluctuating and tempestuous. It is much healthier than that of Buenos Ayres, and totally free from those marsh fevers which are common at the latter place, in consequence of its situation up the river. In winter slight frosts are sometimes observed, but no snow has been known to fall at Monte Video. The mean temperature of the winter is about 55°; that of the river water at the time being the same. The weather, during spring, is very variable and liable to storms. In the summer and autumn it is sultry and oppressive, especially during the long calms which take place; but in the middle of the day there is generally an agreeable breeze from the S.E. Northerly winds are accompanied by rain, and a S.E. wind is frequently so; but the wind from the S.W. is most free from it. Violent gales are common at all seasons of the year, attended frequently with thunder-storms; but these are most severe during summer and autumn. Sometimes the thunder-storms are accompanied by hailstones of a considerable size, which not only break windows, but kill poultry; they often terminate in a *pampero*, the well-known hurricane of the country. It is said that, in a pampero, sand and small gravel have been blown on board the ships in the roads, a distance of 7 or 8 miles from shore.

(125.) Mr. Webster has described the indications of a pampero, from his own observations, as follows:—The weather is sultry during a few days, with a light breeze from the East or N.E. ending in a calm. A cool light wind then sets in from the South or S.E., but confined entirely to the lower strata of the atmosphere, while the clouds above it are moving in the opposite direction from N.W. to S.E. The northern horizon, as night advances, becomes dark with heavy lowering clouds, accompanied with lightning from the East or N.E. The southern wind now ceases, and is followed by variable winds from the northward. Heavy clouds are thus brought over; and lightning, accompanied by thunder, follows in a most terrific manner. The wind veers gradually to the westward in violent gusts, the lightning becomes more vivid, and the thunder more awful; a gale of wind follows from the S.W. more violent, but of short duration, and fine weather ensues.

These pamperos are very destructive to shipping, and frequently occasion wrecks and the loss of boats. The lightning is beautifully coloured, presenting the hues of orange, violet, and pink. Mr. Webster adds, "I have also witnessed at Monte Video very remarkable instances of electric light, playing like the *aurora borealis*, at an altitude of 20° above the horizon. One evening, October 4th, I observed an arc of light which remained permanent, with a tremulous motion, for the space of twenty minutes; a strong gale of wind was blowing at the time: it was of a pale yellow colour, and flashes of lightning frequently appeared beneath it. Meteors or falling stars are very rare, and earthquakes are scarcely known here."

(126.) During a visit to the River Plata by Captain King, in the *Adventure*, a pampero of unusual violence occurred. "On the 30th of January, 1829, after some intensely hot and sultry weather, we experienced a severe pampero. It was preceded by the barometer falling to 29·50, and by a strong N.W. wind, which suddenly veered round to S.W., when the pampero burst upon us. Our ship and boats fortunately escaped any bad effects from the violence of the squall, which was so strong as to lay the former, at anchor, upon her broadside. The spray was carried up by whirlwinds, threatening complete destruction to everything that opposed them. In less than half an hour it had diminished to a strong S.W. gale, which lasted during the night." "On the night of the 2nd of February we experienced another very severe pampero, during which one of the *Beagle's* boats, hauled upon shore, was blown to atoms. The barometer had previously fallen to 29·39." *

(127.) Captain Heywood gives the following remarks concerning the winds, weather, &c., in the River Plata:—At the entrance of the River Plata the prevailing winds during the summer months, from September to March, are north-easterly, with tolerably clear weather overhead, but a dense atmosphere near the horizon. These winds haul gradually to the eastward as you advance up the river; and about the full and change of the moon, strong breezes from the south-eastward are common at this season, accompanied with rain and foul weather. At Buenos Ayres during the summer months the S.E. winds are generally fresh in the daytime, hauling round to the northward in the night.

During the winter months, from March to September, the prevailing winds, at the entrance of the Plata, are S.W., or more westerly; but up the river, more generally from the northward, than the southward, of West.

The winter season is the best, in point of weather, at Buenos Ayres; for the winds being chiefly from N.W. to S.W., the water is smooth, and the communication can be kept up between the shore and the shipping with more facility. The weather is sometimes, but not frequently, foggy. Fogs are most common in the months of July, August, and September, and prevail more at the entrance of the river, as far up as the S.E. tail of the Ortiz, than above the banks.

PECULIARITIES OF WIND, TIDES, AND CURRENTS.—The River Plata has many singularities, which I think may, in a great measure, be accounted for from its formation being so different from any other known river. Its entrance, being very wide and very shallow, it is affected by every change of wind in a most extraordinary manner; so much so, that a shift of wind may be predicted almost to a certainty, by observing carefully the state of the mercury in a barometer and the set of the currents, which usually shift before the wind. In *calm* weather the currents are generally very slack; and then as regular almost as tides, setting up and down the river alternately. When the winds are variable, the currents are equally so; and I have known the *Nereus* to be current-rode four different ways in less than 6 hours. When the current comes in from the eastward, along the North bank of the Plata, a north-easterly wind may generally be expected to follow; and at the same time (should the wind have been previously to the S.E.) the mercury in the barometer will fall a *little*: but much more if the transition be quick from S.W. without stopping in the south-eastern quarter.

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* Narrative, &c., Vol. I., p. 189.

When the wind continues in the N.E. quarter the mercury is more depressed (according to its strength) than with any other wind, and there is usually, *then*, a set *into* the river on the North bank, and *out* on the *opposite*. Indeed, whilst the winds are between N.E. and S.S.E., the current generally runs to the westward past Monte Video, though without much augmenting the depth of water off that place, but filling the river above the banks.

The winds between N.N.E. and W.N.W. make the water lowest, the outset being then strongest along the South bank of the river, past the Points Del Indio and Memoria, but very inconsiderable along the North bank.

Before the setting in of a S.W. gale or pampero, the weather is usually very unsettled, and the winds unsteady and variable in the northern and north-western boards, preceded by a considerable fall in the mercury, though it usually rises a little again before the wind shifts to the S.W., and often continues to rise, even though the wind may increase from that quarter.

Before these winds set in Buenos Ayres, the current runs up and fills the river unusually high; at the same time as strong an outset is experienced along the North bank, which continues whilst the winds are strongest from W.S.W. to South, seeming to prove that these winds force up, from the southward, a large accumulated body of water past Cape St. Antonio, which can only find a passage out again by the North shore, where they increase the depth of the water, as well as up the river, and particularly in the shallow harbour of Monte Video. Whilst these S.W. winds blow, the air is cold, and the atmosphere clear and elastic, in a degree rarely to be met with in any other part of the world. They are generally succeeded by some days of fine, serene weather, the wind continuing moderate from the southward, or varying to the eastward.

I have never known the velocity of the tide or current, in the River Plata, anywhere to exceed 3 knots per hour; but I have heard it said by some that they have found it run at the rate of 6 or 7 miles an hour!

As the winds outside the River Plata, and particularly about Cape St. Mary, are most frequently from the north-eastward and northward, except when the S.E. summer and S.W. winter gales blow, about the times of new and full moon, I consider it, on the whole, most advisable for ships bound into the river to get in with the land about the latitude of that cape, which is 34° 40′ S., and its longitude 2° 9′ E. of Monte Video.

(127.) The following remarks on the winds of the Rio Plata are by the late Capt. R. von Bronikowski, 1865:—

The winds to be dreaded by sailing ships and guarded against in the river, as well as by approaching the same, are the winds from the western quarters; and I would advise shipmasters, when bound to the Plata, to keep a strict eye more on the state of the weather and appearance of the sky than on the state of the mercury in the barometer. Not to say that the barometer should not be consulted, far from it; but to take it as an infallible guide, I certainly do object. The great depression of the mercury before the setting in of a pampero, and the sudden rise when the gale veers to the West and S.W., do not always take place. I have experienced several instances where the mercury kept quite stationary during the successive changes of wind from N.E. to North, N.W. and S.W., and even to S.E. But before these visitants burst upon the ship they give ample warning. The air, before the setting in of one of these thunder-storms, although close and sultry, is often clear to such a degree as to dazzle the eye. Objects are seen at a great distance, and seem to advance towards the spectator. Heavy masses of clouds rise in the N.W. quarter, with distant thunder and lightning. These masses of vapour rise quickly, and assume a most appalling aspect. The incessant flashes of beautiful pink-coloured lightning interlace one another like a hundred fiery serpents, while the deafening roar of thunder is most terrific. Fierce gusts of wind follow one another in quick succession, and while the rain pours down in torrents, the wind veers to the S.W., South, and often S.E. The weather then soon begins to clear up, and a gale from the southern quarters, but often only a moderate wind, and fine weather follows.

Vessels running down the coast between Rio Grande and the Plata with a N.E. wind, should pay particular attention to the state of the weather. A dense, close atmosphere and gloomy weather, are sure forerunners of much wind from the western quarters, accompanied by terrific thunder and lightning.

I may remark here that the approach of the 1st of September, the feast of Santa Rosa, is looked for in the River Plata with a good deal of anxiety, and still more superstition, by all classes interested in the shipping, and it has become a popular notion, even amongst the better informed, that that day is doomed to be a day of shipwreck and disaster throughout the boundaries of the Plata. These gales are easily accounted for. The feast of Santa Rosa is near the equinox, and these destructive gales therefore are the equinoctial gales of the southern hemisphere. Vessels going up or down the river between Point del Indio and Buenos Ayres, should keep an eye open to the S.W. The squalls coming off the South shore, properly called pamperos, are very fierce, and give but short notice. Sudden changes occur from a moderate breeze and clear weather to a whole gale of wind in less than a quarter of an hour.

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5. The Anti Trades or Passage Winds.

(128.) This region of the "brave west winds," as they are termed by Capt. Maury, encircles the earth to the southward of the tropical calms and variables, as far southward as is practicable for navigation. It varies very irregularly between N.W. and S.W. with a mean direction, probably, of about West, and this is found in the line of its greatest strength, or about the parallel of 45° S., shifting with the propress of the seasons.

(129.) It is this West wind which, in the southern winter, is such an obstacle to making way around Cape Horn, which protrudes so far into its influence, on the one side, and from the Indian to the Atlantic Ocean around the Cape of Good Hope on the other. In the former case we shall give such observations and instructions as are necessary hereafter. For leaving the Indian Ocean by this route, the reader is referred to our recent Directory for the Indian Ocean, where the subject is fully discussed.

(130.) As to the intermediate space between the two Capes of the Atlantic Ocean, it is almost unknown, and Captain Maury says that amid the thousands of logs which he has examined and discussed, only two of them record passages from one cape to the other. Therefore the phenomena of this mid-ocean tract is comparatively unimportant to navigation. The illustrative diagrams on the wind charts must serve to show the prevalence and direction in each space, as far as is known.

(131.) BAROMETER.—The value of this instrument as an indication of wind in high southern latitudes has been the subject of much controversy. By many it has been considered as useless, but, as will be seen, this opinion is based on a comparison with its indications in the northern hemisphere. The mean of all observations of the height of the barometer between the parallels of 55° and 60° *North* latitude is 29·85 inches, while in the same latitude in the South it is only 29·24 inches, a difference of six-tenths,—so low that its fine weather monition in the South would be taken for a forerunner of a gale in the North. The mean height of the barometer, for the year, at Greenwich is 29·956 inches, as reduced to the sea level.

(132.) The low barometer, especially in the Austral winter off Cape Horn, and in high South latitudes, had been the subject of universal remark, and this anomaly led the late Admiral FitzRoy to institute an inquiry into the actual condition of the atmosphere by a wide comparison of the observations made. The results were not attained until after his death, and their main features are given below, as published by the Meteorological Department.

(134.) It has long been a well-known fact that the average height of the barometer diminishes from the juxta-tropical zone towards the arctic, and the importance of obtaining normal barometric heights for different parallels of latitude, pointed out long ago by the Royal Society, has since been insisted on by many eminent meteorologists, more especially by the distinguished chief of the Meteorological Institute of Utrecht, but until the publication, in 1861, of Captain Maury's results, it was not supposed that the diminution of average barometric pressure in high southern latitudes was so rapid or so uniform as it then appeared.

From nearly 7,000 observations of the barometer South of the parallel of 40°, Maury obtained the following average heights :—

Inches.
Between 40° and 43° S., from 1,703 observations, barometer = 29·88
Between 43° and 45° S., from 1,130 observations, barometer = 29·78
Between 45° and 48° S., from 1,174 observations, barometer = 29·63
Between 48° and 50° S., from 672 observations, barometer = 29·62
Between 50° and 53° S., from 665 observations, barometer = 29·48
Between 53° and 55° S., from 475 observations, barometer = 26·36
In 56½°, from 1,126 observations, barometer = 29·29

To the southward of 56°·30′ Captain Maury appears to have had no observations, but he assumes that the average barometric pressure diminishes in higher latitudes in the same proportion, and concludes that at the South pole it is as low as about 28·14.

The low average height of the barometer in high southern latitudes was noticed by Sir J. C. Ross during his Antarctic expedition, and the low barometric pressure in the neighbourhood of Cape Horn has frequently been remarked. Capt. Maury's observations indicate an average diminution of pressure between 40° S. and 60° S. of about two-tenths of an inch for every five degrees of latitude. His observations were, however, comparatively few (not quite 7,000), while the area embraced was large, and to ascertain the nature of his conclusions, the inquiry was instituted, of which the results are given presently.

A very large number of reliable observations, available for the purpose, existing in the Meteorological Registers received by the Board of Trade, it was determined, after much consideration, to proceed in the following manner.

The first portion of the inquiry included over one hundred thousand observations, made on about eleven thousand days. Four groupings, or collections, were made for each month and for successive zones of five degrees between 40° S. and 60° S.; showing, first, the number of days on which the barometer was *high* (that is, on which the *average* height was above 30 inches) and the mean of these readings; secondly, the number of days on which the mean reading of the barometer was between 30 inches and 29·5 inches, and the mean of these readings; thirdly, the number of days of observation and mean barometric readings between 29·4 inches and 29 inches; fourthly, the number of days of observation and mean of barometric readings below 29 inches.

The first of these groups or collections was called *High*, the second *Upper mean*, the third *Lower mean*, and the fourth *Low*.

A fifth collection for each month was then made of the number of days of observation and mean of *all* barometric readings for each zone of 5° of latitude.

TABLES showing the MEAN HEIGHTS of the BAROMETER during each Month of the Year, for each 5° of Latitude, between the Parallels of 40° and 60° South Latitude.

—	40° to 45°						45° to 50°					
	a	*b*	*c*	*d*	*e*		*a*	*b*	*c*	*d*	*e*	
	Bar.	Bar.	Bar.	Bar.	Days.	Bar.	Bar.	Bar.	Bar.	Bar.	Days.	Bar.
Jan.	30·21	29·75	29·36	—	287	29·99	30·22	29·70	29·30	28·88	238	29·69
Feb.	·22	·76	·31	28·70	349	30·08	·20	·70	·33	·85	215	·85
March ..	·24	·78	·33	·83	333	29·99	·19	·71	·30	·87	246	·74
April ..	·22	·75	·33	—	328	30·04	·20	·75	·32	·85	209	·76
May ..	·22	·74	·27	·79	332	29·87	·22	·70	·28	·81	219	·72
June ..	·21	·72	·30	·80	381	·85	·27	·69	·30	·68	186	·65
July ..	·24	·76	·35	·80	368	·99	·24	·74	·24	·90	125	·82
August ..	·27	·74	·28	·90	424	·98	·19	·74	·33	·85	125	·83
Sept. ..	·25	·75	·30	·78	402	·96	·22	·73	·30	·79	225	·77
October .	·26	·75	·27	—	401	30·02	·20	·72	·30	·63	200	·77
Nov. ..	·23	·74	·28	·90	380	29·94	·19	·72	·30	·81	306	·70
Dec. ..	·21	·77	·30	—	371	·98	·16	·70	·29	·86	314	·67
Total Days of Observation and Means..					4356	29·97					2608	29·74

—	50° to 55°						55° to 60°					
	a	*b*	*c*	*d*	*e*		*a*	*b*	*c*	*d*	*e*	
	Bar.	Bar.	Bar.	Bar.	Days.	Bar.	Bar.	Bar.	Bar.	Bar.	Days.	Bar.
Jan.	30·11	29·67	29·28	28·77	252	29·41	30·20	29·66	29·24	28·76	217	29·25
Feb.	·14	·66	·29	·78	211	·44	·15	·62	·29	·80	236	·23
March ..	·22	·70	·27	·86	207	·57	·21	·66	·21	·75	163	·25
April ..	·17	·68	·27	·71	166	·44	·12	·70	·20	·68	149	·20
May	·28	·66	·26	·72	205	·41	·18	·67	·24	·73	111	·39
June	·27	·65	·24	·82	158	·48	·18	·61	·24	·74	123	·28
July	·24	·73	·25	·74	165	·53	·15	·76	·25	·77	69	·54
August ..	·22	·66	·28	·84	182	·56	—	·64	·24	·68	59	·28
Sept. ..	·21	·67	·28	·77	140	·51	·12	·63	·22	·67	124	·29
October .	·15	·69	·27	·77	161	·48	·13	·61	·23	·75	120	·10
Nov. ..	·12	·63	·24	·69	214	·31	—	·60	·24	·74	123	·11
Dec. ..	·17	·65	·34	·75	270	·43	·10	·67	·21	·78	180	·21
Total Days of Observation and Means..					2331	29·46					1674	29·24

The figures in columns *a*, *b*, *c*, *d*, *e*, show—

- *a* Mean of Barometer Readings *above* 30 *in.*
- *b* Mean of Barometer Readings *between* 30 *in. and* 29·5 *in. inclusive.*
- *c* Mean of Barometer Readings *between* 29·4 in. *and* 29 *in. inclusive.*
- *d* Mean of Barometer Readings *below* 29 *in.*
- *e* Number of Days of Observation and Mean of *all* Barometer Readings for each 5° of Latitude.

(135.) The following are the general results of the whole inquiry, between the parallels of 40° S. and 60° S.

Of 5,248 *days* examined, between 40° and 45° S., the mean height of the barometer was above 30 inches on 2,679 days, more than half the whole number; between 30 inches and 29·5 inches on 2,133 days; below 29·5 inches but above 29 inches on 392 days; and below 29 inches on only 44 days.

Between 45° and 50° S., out of 2,980 days examined, the days of *High* barometer were 843; of *Upper mean* 1,446; of *Lower mean* 573; and the days on which the mean height was below 29 inches, or *Low*, were 118.

Further southward the proportion of days of *Low* barometer increases rapidly; between 50° and 55° the barometer was *Low* on 350 days out of 2,987; the days of *Lower mean* being 1,071; of *Upper mean* 1,265; and of *High* barometer only 301.

Between 55° and 60° S. the observations of 1,953 days have been examined. Of these the days of *High* barometer were only 88; of *Upper mean* 526; of *Lower mean* 775; and the days of *Low* barometer, that is, the days on which the average pressure was below 29 inches, were as many as 564, or between one fourth and one third of the whole number.

The approximate mean height of the barometer, for each zone of five degrees, obtained from about 115,000 observations made on 13,168 days, is 29·97 between 40° and 45°; 29·74 between 45° and 50°; 29·46 between 50° and 55°; and 29·24 between 55° and 60°.

Maury's heights for the same parallels are respectively nearly 29·83, 29·63, 29·43, and 29·29. The observations used by him did not amount to quite 7,000, and he observes that the instruments from which they were obtained "were for the most part the old-fashioned marine barometer to which no corrections have been applied." Still his results show a considerable general agreement with the results obtained here from more than sixteen times as many observations made chiefly with compared and reliable instruments having insignificant errors.

(136.) In *mid-ocean*, as before alluded to, our knowledge is but very scant. It will be seen that the line dividing the separate wind systems has a curve to the northward during some periods of the year, and does not follow the same parallel of latitude between the two continents. By referring to the chart of the currents and the ice drifts, hereafter given, it will be seen that there is a great inset of cold water from the south-west, around Cape Horn, which passes with great strength and persistence far to the N.E. of the extremity of South America, and, also during a large portion of the year, bears a great quantity of ice into low latitudes. There is something analogous in the Arctic and Labrador Current over the Newfoundland Banks. Whether this has any bearing on this want of symmetry in the wind zones, which might be reasonably argued, must be determined by closer enquiry than has as yet been brought to bear on it. But in crossing this tract, should any unexpected change of wind or weather be encountered, it might direct attention to this point.

(137.) Of the Winds and Weather off the Patagonian Coast, between *Cape Blanco* and the *Virgin's Cape*, Captain King says, "Our experience of the wind and weather upon this coast was not sufficient to enable us to form any judgment of the changes that are liable to occur. The prevailing winds, particularly towards the southern portion, are from the S.W., from which quarter the gales are the strongest; but near the land, during the summer season, they veer about between South and W.N.W.; and in the winter, when the sun has northern declination, they hang more commonly to the northward of West. Northerly winds are accompanied by misty or foggy weather, particularly on that portion of the coast between the Rio de la Plata and Port Sta. Elena.

The marine barometer here is of signal advantage. It is low, with a northerly wind, but so soon as the column has fallen to 29 inches, or lower, and ceases to fall, a change of wind from the S.W. may be expected; which commences with, or very soon follows, the ascent of the mercury; the wind then freshens, and blows hard, and the weather clears up. The clouds are white, of large size, and rounded form, and the air becomes elastic, dry and cold. During the existence of, and for some days preceding, a northerly wind, thdre is generally a very copious deposition of dew; indeed, the appearance of it is an infallible presage of the change. With northerly winds the air is mild and excessively damp, but when they blow from the opposite quarter it is cold and dry. The wind rarely blows from East, but sometimes obliquely toward the coast from N.E. or S.S.E.—(*Directions for the Coast of Patagonia*, by Capt. P. P. King, R.N., p. 17.)

(138.) STATEN ISLAND.—The climate of Staten Island is remarkably humid; and very few days can be passed there, in the course of the year, without rain; and it is rather remarkable that, however fine the weather may have been in the course of the day, some rain generally falls at night. Rain, however, is frequent there in all seasons of the year, and the sky is generally overcast. Thunder and lightning are scarcely known. The temperature may be considered as equally low, and varying little throughout the year. Frost is not very severe, nor very common in winter, and the snow does not lie long on the low grounds. The weather during summer is cool, but still humid; and, as a general characteristic, may be considered boisterous, unsettled, wet, and dull. Vegetation lingers slowly in its summer's bloom, and is not nipped by the severity of the winter's frost.

On shore the weather was a few degrees warmer than on board; and at night it was colder. The most retired harbours of the island are not frozen. The wind is generally from the westward nine days out of ten, ranging from S.S.W. to N.N.W. Gales from the S.W. prevail during the summer, and from the N.W. in winter. Easterly winds are most prevalent in the winter months.*

(139.) TIERRA DEL FUEGO.—In the winters of Cape Horn, and its vicinity, wind, accompanied with rain, sleet, snow, or hail, is the prevailing characteristic. The humidity is excessive; for besides that arising from the vast expanse of ocean by which it is surrounded, rain, more or less, falls every night. The rain is so violent and incessant, that one might suppose the waters of the firmament were again falling in the shape of a second deluge. The gullies between the hills become so many courses for torrents of water, and the continuance of the rain at times is so protracted that a temporary gleam of sunshine is cheering to behold.

S.W. gales, attended on the onset with thunder and lightning, are exceedingly violent about the Cape, and are accompanied by the most terrific squalls, which may almost be considered as hurricanes. They rush down the ravines in the hills with most awful violence, threatening destruction to all before them, carrying the sea up in spray to the height of some hundred feet. The N.W. gales are not generally considered so heavy as those from the S.W. quarter; they are always accompanied by rain, but, nevertheless, blow with great force, and frequently veer round to the S.W. without abating their fury. The wind again will commence in the N.W., and be rapidly succeeded by a gale from some other point of the western quarter, most generally the S.W.

Easterly winds are reported to be most prevalent in the winter months of June and July, but they seldom blow with much strength, nor are they of long duration. It may be generally expected that they will be succeeded by a westerly gale. The weather accompanying them is mild and fine, but there are very few days in a month of fine tranquil weather. A gentle breeze from the N.W. is sometimes attended with fine weather. None of the little bays or harbours hereabout are ever frozen up, nor are those of Staten Island.

All circumstances prove that the southern regions of the globe are milder than the northern in equal latitudes. The Fuegian Indians are perfectly naked; they care for no dress, and seldom use it. Where such is the case the cold cannot be very severe.

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* Voyage of the *Chanticleer*, Vol. I., pp. 129, 130.

The fact appears to be, that a low mean temperature prevails throughout the year in the Southern Seas: at Cape Horn the sun produces but little effect in the summer, and there is no intensity of heat for a few months as in the northern regions, owing, apparently, to the disproportionate expanse of ocean to that of land. The climate of the Falkland Islands corroborates this assertion. There it is mild, the thermometer being seldom seen so low as 32°, generally ranging about 50°. Snow never lies there for 24 hours, excepting on high land: the harbours are never frozen up, and the crews of vessels go bare footed with impunity.

In consequence of the equability of temperature in the climate of Cape Horn, produced by the immense expanse of ocean, the summer is much cooler than in the same parallel of the northern hemisphere; for there is no terrestrial radiation, nothing, as it were, to catch the sun's rays, which fall almost powerless on a wide extensive sea; but the winter compensates for this deficiency, and a remarkable degree of mildness prevails; for as the sea preserves nearly a uniform mild temperature throughout the year, above 44°, the air over it can never remain much below it for any great length of time.

Hail is frequent at a temperature from 42° to 48°. The nights at Cape Horn when clear are remarkably so; this arising, no doubt, from the humidity of the atmosphere, which increases its transparency. The cloudy nights prevent any radiation; and as the sun seems to act a subordinate part in this climate, there is a perfect equality of temperature throughout the 24 hours.

With severe S.W. gales the barometer falls, and very considerably, and the finest weather has been found with the lowest state of the barometer. A gentle N.W. breeze has been attended with very fine weather, and the barometer below 29°. The height of the mercury is perpetually fluctuating, showing a constant change in the aerial column.[*]

The heaviest and most lasting gale, says Captain Weddell, that blows in the neighbourhood of Cape Horn, is from South, occasionally shifting a point or two each way. This gale I have frequently known to come on in a squall, and continue, in the tempestuous months, to blow from thirty-five to forty hours together. The southern horizon, filled with rising clouds, heavy and white, in a blue sky, is a sure indication of a lasting gale, with snow squalls. A complete calm commonly follows this wind, which, however, is not very frequent. The wind at East invariably rises light, and generally increases to a strong breeze; but when it veers from East to S.E., a strong gale may generally be expected, with snow or rain squalls.

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[*] Voyage of the *Chanticleer*, Vol. I., pp. 193, 202. In pages 75—77, are given the recent determinations as to the mean height and indications of the barometer in high southern latitudes, and its great depression compared with northern. Captain King said (when surveying the coast):—"With respect to the utility of the barometer, as an indicator of the weather that is experienced off Cape Horn, I do not think it can be considered so unfailing a guide as it is in the lower or middle latitudes. Captain FitzRoy, however, has a better opinion of the indications shown by this valuable instrument; my opinion is, that although the rise or fall at times precedes the change, yet it more frequently accompanies it."—*Narrative of the Voyages of the Adventure and Beagle*, Vol. I., p. 465. And that fine weather may occur when the barometer is very low, as above stated, the following extract from the same work will demonstrate:—"April 2nd, 1830 (near Cape Horn), the glass had been falling so much, and was then so extremely low, that I thought it prudent to prepare for the worst, and struck topmasts. Notwithstanding the unusual fall of the barometer and sympiesometer, and their still continuing to sink, this day was as fine, and seemed likely to continue so, as any day I had ever seen, therefore we took advantage of it. 3rd and 4th.—Still very fine weather, although the barometer and sympiesometer were lower than I had yet seen them in this country. 5th and 6th.—Two more fine days, with a very low glass, shook my faith in the certainty of the barometer and sympiesometer. During those days the wind had been light from N.N.W., and twice before I had known these instruments to be similarly affected during exactly similar wind and weather. The mercury in the barometer had now fallen to 28·94, and the oil in the sympiesometer to 28·52; the thermometer ranging from 40° to 48° Fahrenheit. 10th.—Still fine steady weather, notwithstanding the unusually low fall of the barometer. 12th.—The glasses had at last been rising; and during the past night and this day the wind was very strong, with much rain. The wind shifted from the northern quarter into the southern, drawing round to the S.E., which of course would make the mercury rise higher after being so very low, though the weather might prove extremely bad."—*Ibid*, pp. 426—429. These remarks may be compared with those previously given.

A North gale also comes on gradually, and towards the end, which is generally in about thirty hours, it draws from the N.W., and brings rain, and presently shifts into the S.W., without ceasing to blow, and continues from that point twelve or fifteen hours. All gales are of shorter duration in summer than in winter; and it may be remarked that a vessel may anchor anywhere for shelter from a S.W. wind without the fear of its shifting to the northward; but the contrary must be guarded against as the wind shifts from N.W. to S.W., continuing to blow with great violence.

In the most windy months N.W. gales blow with great force, when they rise rapidly near that point, and generally last twelve or fourteen hours. To the S.W. of Cape Horn they blow with less violence, but are more durable. In the summer season the winds between S.W. and N.W. frequently blow in gusts of six or eight hours' continuance, at the strength of a brisk gale; it then becomes moderate, and the wind inclines to the northward.

In the summer I have observed the coincidence of fine weather with light easterly winds at the time of new moon, when in South declination, and at the time of full moon to blow strong from the northward. There being many exceptions, however, to the natural action of the wind, produced by localities, I have found it impossible to systematize the indications of the winds and weather satisfactorily. We must, therefore, rest contented with an approximation to certainty in these matters." *

Captain Monteath says, "It is my opinion that the winds near Cape Horn are greatly influenced by the moon's position, and that easterly winds will in general be found more prevalent during the summer months, when that body has attained a high southerly declination; as proofs, I subjoin the following remarks:—

On the 25th of January, 1824, in lat. 56° 29′ S., long. 70° 57′ W., and the moon's declination 25° S., the wind shifted to the N.E., gradually hauling round to the S.E. until the 30th, when it shifted to the West, it being then new moon, and the declination had decreased to 16° S., the lat. 56° 40′ S., long. 65° 30′ W.

On the 18th of January, 1825, in lat. 56° 42′ S., long. 64° 50′ W., new moon, and declination 20° S., the wind (which had been from the S.W.) shifted to the E.N.E., gradually hauling round to S.E. until the 21st, the moon's declination having decreased to 8° S.; the lat. 56° 43′ S., long. 72° 32′ W. And on the 19th of July, 1825, in lat. 39° 10′ S., long. 88° W., moon's declination, 2° S., and increasing, the wind shifted to the eastward, and continued between the N.E. and S.E. quarters, until the 20th, it being full moon, the declination 16° S., the lat. 55° 40′ S., long. 84° 50′ W.

(140.) The SEASONS in the vicinity of CAPE HORN have also been described by Admiral Robert FitzRoy, when commander of H.M. surveying sloop *Beagle*. This gentleman reported that the equinoctial months are the worst in the year, generally speaking, as in most parts of the world. Heavy gales prevail at those times, though not, perhaps, exactly at the equinoxes. August, September, October, and November, are the worst months in the year. Westerly winds, rain, snow, hail, and cold weather, then prevail.

December, January, and February, are the warmest months; the days are long, and you have some fine weather; but westerly winds, very strong gales at times, with much rain, prevail throughout this season, which carries with it less of summer than in almost any part of the globe.

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* Weddell's Voyage toward the South Pole, 1822-24, pp. 237, 238.

March is stormy, and perhaps the worst month in the year with respect to violent winds, though not so rainy as the summer months.

In April, May, and June, the finest weather is experienced; and though the days shorten, it is more like summer than any other time of the year. Bad weather is found during these months, but not so much as at other times. Easterly winds are frequent, with fine, clear, settled weather. During this period there is some chance of obtaining a few successive and corresponding observations. To try to rate chronometers by equal altitudes would be a fruitless waste of time at other seasons. June and July are much alike, but easterly *gales* blow more during July.

The days being so short, and the weather cold, make these months very unpleasant, though they are, perhaps, the best for a ship making a passage to the westward, as the wind is much in the eastern quarter.[†]

I should say that the summer months, December and January, are the best for making a passage from the Pacific to the Atlantic Ocean, though that passage is so short and easy that it hardly requires a choice of time. For going to the westward, I should prefer April, May, and June.

Lightning and thunder are seldom known; violent squalls come from the South and S.W., giving warning of their approach by masses of clouds. They are rendered more formidable by snow, and hail of a large size.

(141.) The FALKLAND ISLANDS.—The late Captain (afterwards Admiral) John M'Bride, kept a regular journal of the winds and weather at the Falkland Islands, from the 1st of February, 1766, to the 9th of Januarp, 1767, which was published in 1775 by Mr. Dalrymple. The journal concludes with the following general remarks.

"From looking over the foregoing journal of the winds, for the space of one year, they will be found to prevail in the western quarter, and generally blow a close-reefed topsail gale, with a cold air. In November the winds begin to be more frequent in the N.W. quarter, generally hazy weather, and for the most part blow about sixteen or twenty hours, when it begins to rain; the wind then regularly shifts into the westward, and so on, till it gets to the S.W. by S. and S.S.W., when it blows fresh and clears up. This S.S.W. wind continues for about sixteen hours, then dies away, when the wind shifts again to the N.W. quarter; this continues during December, January, and February, and changes in the manner above mentioned every three or four days. As March comes on, you have these changes but seldom; and, as the winter advances, they are seldom in the N.W. quarter, but rather incline to the E.N.E., which is generally accompanied with sleet and snow. There is not the least proportion in the gales between winter and summer. In summer (as I have before observed), as the winds are in the westward, they blow in such heavy squalls off the tops of the mountains, that it is sometimes an hour before a cutter can row to the shore, although the water is smooth, and the distance of but 1½ cable off. In winter the winds are pent up by a keen frosty air: the most lasting gales are those from S. by E. to S. by W., and are extremely cold.

"In January and February the thermometer sometimes rose to 52°, but no higher. In August it once fell to 20°, but was seldom lower than 32°."

Of the Isles, in general, Capt. M'Bride has said, "We found a mass of islands and broken lands, beaten by storms almost perpetual. Yet this is summer; and if the winds of summer hold their natural proportion, those who lie but two cables' lengths from the shore must pass weeks without having any communication with it."

[It is to be observed that Capt. M'Bride's remarks more particularly apply to *Port Egmont*, on the North side of the Great or Western Island.]

In a description of the Eastern Falkland Island by Don Louis Vernet, who resided

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[*] But, upon this subject see more hereafter, in the Remarks on Passages, &c.—Edit.

there for several years, it is stated that the climate on this island is, on the whole, temperate; the thermometer never falling below 26° in the coldest winter, nor rises above 75° in the hottest summer; its general range is from 30° to 50° in winter, 50° to 75° in summer. The weather is rather unsettled, particularly in winter; but the showers, whether of rain, snow, or hail, are generally of short duration, and their effects are never long visible on the surface of the ground. Thus floods are unknown; snow disappears in a few hours, unless on the tops of the mountains; and ice is seldom found above an inch thick. Thunder and lightning are of rare occurrence; fogs are frequent, especially in autumn and spring, but they usually dissipate toward noon. The winter is rather longer than the summer, but the difference is not above a month; and the long warm days of summer, with occasional showers, produce a rapid vegetation in that season.

Lieutenant Moody, the governor of the Falkland Islands, in a despatch, dated October 1st, 1842, says, "In a former report I noticed the extraordinary dryness of the atmosphere, produced chiefly by the constant winds of summer. During the past winter months of June, July, and August, the excess of moisture and dampness has been equally remarkable, unaccompanied, however, by rain, and, comparatively with England, there was but little snow. The ice has been sufficiently thick to bear the weight of a man twice, for two or three days together; and the thermometer has occasionally been as low as 25°, and once 18° during the night. The wind has been by no means so strong or violent as in summer, and calm days and sunshine occurred very often, much more frequently than in England.

"There have been only three strong gales (one occurred while H.M.S. *Carysfort* lay in the port, and it was accompanied with a heavy fall of snow) since April, except from the 18th to the 24th of September (corresponding with March in England), during which period the equinoctial gales were very violent. Upon the whole, the winter, though considered in this place as very severe, would have been thought mild in England. The dryness of the air is now again beginning to be apparent, and a fine summer is anticipated. Already the thermometer has risen as high as 69°. My present opinion therefore is, that the winter of the Falklands may be considered very mild, but moist, though not rainy, and with little wind. The moisture does not arise from rain or fog, but from the ground; a light soil upon a tenacious subsoil, numerous springs, and rivulets, and the absence of the evaporating winds of summer.

"The progress of cultivation, and consequent drainage of the land, will therefore ameliorate the climate."

The wind blows commonly from the N.W. in summer, S.W. in winter, and seldom long from the eastward in either season. The finest weather in winter is when the wind draws from the West or N.W.; and in summer, when it stands at N.W. or N.E. A North wind almost always brings rain, especially in summer; and East and S.E. winds are constantly accompanied by thick and wet weather. Snow squalls generally come from the S.S.E., South, and S.S.W. Storms are most frequent at the changes of the seasons, and blow commonly from S.S.W. to W.S.W.; but they seldom last above twenty-four hours.—*Geographical Journal*, III. p. 95.)

(142.) SOUTH GEORGIA and SANDWICH LAND.—The climate of these islands may be briefly described. Here reigns an everlasting winter. Not a tree or shrub is to be seen. The wild rocks raise their lofty summits to the clouds, and the valleys are covered with snow. "Who would have thought (asks Captain Cook, in describing Georgia), that an island of no greater extent than this, situated between the latitude of 54° and 55°, should, in the very height of summer, be in a manner wholly covered, many fathoms deep, with frozen snow, but more especially the S.W. coast? The very sides and craggy summits of the lofty mountains were cased with snow and ice; but the quantity which lay in the valleys is incredible; and at the bottom of the bays the coast was terminated by a wall of ice of considerable height. The coast alone receives warmth sufficient to melt the snow, and this only on the N.E. side; for the other, besides being exposed to the cold South winds, is, in a degree, deprived of the sun's rays by the uncommon height of the mountains."

(143.) SOUTH SHETLAND.—Of South Shetland the summer may be compared to a dull November in England, and the winter considered as one long starless and desolate night. A perpetual gloom prevails, which the glorious sun seldom or never penetrates, so as to be distinctly seen for many hours together; and as for the stars, they and the moon are scarcely ever visible. Fine days are, "like angels' visits, few and far between." Situated in a high southern latitude, and surrounded by a wide expanse of sea, the atmosphere of South Shetland is loaded with vapour, and everything is damp and humid. The sun's rays act feebly at all times; but in their most powerful form there is nothing to collect or to acknowledge their genial influence; masses of snow and ice repress and overpower their effect. The climate may, however, be considered as healthy.

II.—OF THE TIDES.

The following TABLE and DESCRIPTION OF THE TIDES commence with the northern Coast of Brasil, from East to West; it thence proceeds with the eastern coast of the same, from North to South, and down the Patagonian Coast, &c., to Cape Horn, and next with the Coast of Africa, down to the territory of Good Hope.

Place.	High Water, Full and Change.	Springs rise.	Place.	High Water, Full and Change.	Springs rise.
				h. m.	ft.
SOUTH AMERICA.			Port San Antonio	10 40	28
	h. m.	ft.	Sea Bear Bay............	12 45	20
Para	12 0	11	Port San Josef	10 0	30
San Joao	6 20	14	Nuevo Gulf	7 0	10
Maranham	7 0	17½	Port Santa Elena	4 0	17
Jericoacoara	11 30	12	Port Melo	3 40	15
Aracati	6 0	8	Port Desire..............	12 10	18½
Fernando Noronha	4 0	6	Port San Julian	10 45	30
As Rocas	5 15	10	Santa Cruz River	9 30	40
Cape St. Roque		8-10	Port Gallegos	8 50	46
Parahayba	5 0	12	Coy Inlet	9 30	40
Pernambuco	4 23	6			
Maceio..	4 30	8½			
Bahia	3 30	8	*Falkland Islands, West Falkland.*		
Os Ilheos...............	4 30				
Martin Vas Rocks........	3 45				
Abrolhos................	4 48	6	Ship Harbour, New Island	10 30	
Nossa Senhora da Victoria	3 0	4	Shallow Harbour	9 30	6
Benevente	3 0	5	Hope Harbour	8 10	7
Porto Frio	2 40	4½	Port Egmont............	7 30	11
Rio Janciro	3 0	4	Manybranch Harbour	7 40	7½
Ilha Grande	12 30	5	Fox Bay................	7 0	6
San Sebastian	2 0	4	Port Edgar..............	7 15	6
Santa Catharina Island ..	2 30	3	Port Albemarle	7 15	7
Buenos Ayres............	noon	irr.	Port Stephens	7 45	7½
Rio de la Plata	noon	irr.			
Tristan d'Acunha........		8			
Port Belgrano	6 0	12	*East Falkland.*		
Union Bay..............	4 0	9			
Colorados River	3 40	11	Port San Carlos..........	7 0	8
San Blas................	2 0	12	Port San Salvador	8 10	8
Rio Negro	11 0	14	Port Sussex	8 15	6

Place.	High Water, Full and Change.	Springs rise.
	h. m.	ft.
Port King	7 30	5
Ruggles Bay	7 30	5
Falkland Sound, S entr.	7 0	
„ N. entr.	6 45	
Bay of Harbours	6 0	5
Adventure Sound	5 30	5½
Low Kay	5 0	5½
Walker Creek	6 20	5½
Darwin Harbour	6 30	5½
Mare Harbour	6 0	6
Id. Harb., Choiseul Sound	5 20	6
Port Pleasant	5 0	6½
Port FitzRoy	4 45	6
Port William	5 15	7
Berkeley Sound	5 0	7
South America, East Coast.		
San Sebastian Bay	7 0	
Staten Island	4 30	8
Le Maire Strait	4 0	7
Goree Road	4 0	8
Orange Bay	3 30	6
Cape San Diego	4 30	10
Cape Penas	6 42	12
St. Martin Cove, Cape Horn Islands	3 50	8
Africa, West Coast.		
Gallinas River	6 45	4
Monrovia	6 0	6
Junk River	5 45	5
Edina	5 50	4
Grand Cestos	5 20	4
Sangwin River	5 15	4
Sinou	5 0	4
Cape Palmas	4 30	4
Tafou River	4 45	3-4
Grand Lahou	4 20	4
Axim	4 30	4

Place.	High Water, Full and Change.	Springs rise.
	h. m.	ft.
Cape Three Points	4 0	4
St. George d'Elmina	4 30	6
Cape Coast Castle	4 30	6
River Lagos	6 0	2
River Forcados	4 22	5
River Ramos	4 20	5
River Dodo	4 17	5
River Pennington	4 15	5
River Middleton	4 15	5
River Benin	4 15	7
River Niger, Nun (entr.)	4 8	6
Brass River	4 0	6
Bonny and New Calabar Rivers	5 0	9
Cameroons River		6
Fernando Po	4 0	7
Princes Island	3 45	4¾
St. Thomas Island	3 25	4¼
Anno Bom Island	3 45	5
Corisco Island	5 0	7
Cape Lopez	4 30	
River Gaboon	5 30	3
Mayumba		7
River Congo	4 30	6
San Paul de Loanda	4 30	5
Ascension Island	5 30	2
St. Helena Island	3 11	3
Lobito Bay	2 20	5
Port Alexander	3 0	5
Walvisch Bay	1 54	6
Port d'Ilheo	3 0	8-10
Spencer Bay	10 50	5-6
Ichabo Island	1 0	6
Angra Pequena	2 30	8
Elizabeth Bay		5-6
Port Nolloth	2 30	5¾
Mc Dougall Harbour	2 30	5¾
Hondenklip Bay	2 30	5¼
Roodewall Bay	2 30	6¼
St. Helena Bay	2 30	
Saldanha Bay	2 0	6
Table Bay	2 40	5
Hout Bay	2 20	5
Simons Bay	2 44	5¼

NORTHERN COAST OF BRASIL.—We are, as yet, but imperfectly acquainted with the tides on this coast, but the following remarks will serve to show that the time of flowing, or high water, is progressively later from East to West. At the entrance of the Jaguaripe or Aracati River, near the meridian of 38° W., the time of high water, on the full and change days, is about 5^h. Spring tides here rise 8, and neaps 4 feet. The highest tide is two days after the full and change. The flood stream outside sets constantly to the N.W. along shore, but is seldom stronger than two-thirds of a mile in an hour.

In the *Bay of Seara,* and coast next westward, very little tide is perceptible; but between the *River Perguizas* and *St. Anna's Isle,* near Maranham, there is a regular flow, setting directly on the coast, and which runs an hour longer than the ebb. It has been conjectured that there may be here an under-tow, always running to the westward. In the *Bahia* or *River of St. Jozé*, on the East of Maranham Island, the tide sets with great strength: the flood from E.S.E., the ebb from W.N.W. High water at about 6h P.M.

From off the *Isle of Santa Anna* the flood sets to the S.W. into Maranham Bay; its rate in the offing is commonly more than half a mile in the hour; but, on advancing, its strength increases. In the harbour of Maranham the tide makes at least half an hour before it does outside. High water at about 6h 20′.

At the *Island of St. Joao*, or *St. John*, the tide runs very strongly N.E. and S.W. High water at about 6h 24′ P.M.

Navigators leaving *Maranham* for the coast to the westward have been advised to take three or four days after the full and change of the moon for the time of starting, as the spring tide, at times, previously runs at the rate of 4 miles an hour.

Between St. Joao and Salinas (long. 47° 15′) Captain the Hon. W. Wellesley, in H.M.S. *Sapphire*, found a strong easterly and south-easterly stream running off the shore. Whenever the *Sapphire* was at anchor hereabout, the flood was found to set S.E., and the ebb East. The pilots say that this is always the case from December to May or June, owing to the heavy rains. The *Pickle* schooner, ignorant of this particular, was set back from Atasia to the Bay of Turivazo, a distance, eastward, of nearly 40 leagues, and was unable for some days to make head against it. A French brig of war was likewise set in the same direction.

Near Salinas, during the rainy season, from September to May, the tide along the coast has been found constantly setting from S.E. to East. Between this and the *Rio Para* the tides run very strong, and are very uncertain in their direction, owing to the numerous small rivers and banks in the vicinity, and more especially to the streams of the great River Maranon, which affect them on the West. High water at Salinas about 8h.

M. Tardy de Montravel says that the tides on all the coast between Salinas and Para are felt at 20 miles off; near the land where they are strongest the flood runs into the bays, that is, to S.S.W., at the rate of 1½ and 2 miles; the ebb to E.N.E., at three-quarters to 1 mile an hour.

On the *Braganza Bank*, off Point Tigioca, the time of high water appears to be from 10h to 10h 30m. At Para it flows at 12h 5m p.m., and vessels carry a regular tide up the river. In the port the tide runs with great strength, and without the river, to the N.W., the ebb stream runs strongly until it is blended with those from the Maranon, which set more to the North.

EASTERN COAST OF BRASIL.—We now revert to the *Eastern Coast of Brasil*, from Cape St. Roque southward, and find that at Pernambuco and Bahia, or St. Salvador, the time of high water is 4h 45m, and rise from 6 to 8 feet. In the harbour or port of Cape Frio the time is 1h 40m, and the rise only 4 feet. In the channel, within the Island of St. Sebastian, the time has been given as 2h 30m, but the rise and fall here is scarcely perceptible, at least not regularly so, and the current sets according to the wind. Hence the tide at Rio Janeiro is so little, that it seems to have almost escaped notice; but Captain Owen gives it as 2h 40m, and rise 4 feet.

Within the Harbour of St. CATHARINE the ebb and flood are very unsettled, and and seem to depend almost entirely on the wind. The flood sets in from the North, the ebb from the South; and as the wind is almost always from the sea, the ebb, with a fresh northerly wind, is scarcely apparent, and seldom lasts more than two or three hours. The time of high water, at new and full moon, has been given at 2h 30m, and the rise 6 feet.

In the RIVER PLATA, likewise, there do not appear to be regular tides, but currents, as uncertain in their duration as they are irregular in their rate and direction.

In fine settled weather, with moderate winds, a rise of 5 or 6 feet has however been found here.

PATAGONIA, &c.—*Off the Patagonian Coast* the flood tide sets to the northward, parallel with the coast. Near Virgin's Cape (lat. 52° 18′) the northerly tide ceases at about four hours before the moon passes the meridian; in the Gallegos River it is high water, on the full and change, at $8^h\ 50^m$, and the rise is 40 feet; at Cape Fairweather, 9^h, rise 28 feet; at Coy Inlet between 9^h and 10^h; at Port Santa Cruz, about $9^h\ 30^m$, but in the offing two hours later; Anchorage off Port Julian, $10^h\ 45'$ rise 30 feet; at Sea-Bear Bay, $12^h\ 45^m$, rise 20 feet; Port Desire, $12^h\ 10^m$, rise 18½ feet; Port St. Elena, 4^h p.m., rise 17 feet. In the offing of Port Desire the tides are three and a half or four hours later than they are in-shore, which is probably owing to the eddy tide setting out of St. George's Bay.

(143.) STRAIT OF LE MAIRE, &c.—On the S.W. coast of Tierra del Fuego, westward of the Strait of Le Maire, the tide is felt strongly, causing races and eddies near the projecting points. In the offing the current or tide sets toward the Strait from 1 to 3 miles an hour, when the water is rising on the shore, and the wind westerly. While the water is falling it runs with less strength, and with an easterly wind is not felt at all.

In the Strait of Le Maire it is high water at 5^h, but the flood tide continues to run northward until about 6^h p.m. on the day of new moon. The flood tide is much stronger than the ebb along all this coast, and it sets from the westward; but northward of Staten Island and the Strait of Le Maire the flood tide runs northwestward.

Although 5 and 6 hours are the average times, the tides vary much; being sometimes nearly an hour earlier, and sometimes as much later, on the day of full or new moon.—*Captain FitzRoy.*

They will assist a vessel materially in her passage, if taken at the proper time. Off Cape Diego, the N.W. point of the Strait, when the tide opposes the wind and swell, there is, however, a heavy, and for small vessels dangerous, race of tide; and eddies may, at times, be seen here in every direction.

In Good Success Bay it is high water at 4 hours, and the rise is 6 or 8 feet, according to the wind.

From Cape St. Diego, to the northward, the tide sets North and West along the shore, from 1 to 3 miles; the ebb in a contrary direction, but not so strongly. In the Strait the flood tide runs northward from 2 to 4 miles in the hour, near the Cape, and from 1 to 3 in mid-channel, more or less, according to the strength and direction of the wind. The ebb sets to the southward about 1 mile an hour.

(144.) STATEN ISLAND.—Along the North and South sides of Staten Island the flood tide sets from East to West. It is high water, on the full and change, at the anchorage within the New Year's Isles, as well as on the East side of Strait Le Maire, at 5 hours. The current is very strong, running from 4 to 6 knots. Off Cape St. John is a tide race, which extends to some distance off the point.

Off CAPE HORN and the coast to the westward the stream is strong and irregular. It generally sets eastward, and sometimes 2 miles an hour, as shown hereafter.

(145.) FALKLAND ISLANDS.—Concerning these islands Captain FitzRoy says, "The tides differ much as to strength and direction in different parts of the Archipelago, but the times of sizygial high water only vary from 5^h to 8^h, and the rise of tide is almost similar everywhere, about 4 feet at neap, and 8 feet at spring tides. The principal swell of the ocean, which causes the tidal streams from these islands, comes from the S.E. Scarcely any stream is perceptible on the S.E. coast of East Falkland; but along the North, South, and West shores it increases in strength, until among the Jason Islands it runs 6 miles an hour, causing heavy and dangerous races. Off Berkeley Sound, across the entrance, and near Cape Carysfort, the tide runs about 2 knots at its greatest strength, and thence westward it increases gradually. Into Falkland Sound the tide flows from both openings, and meets near the Swan Islands; showing, I apprehend, that the principal wave or swell impinges upon the coast considerably eastward of South.

"The tidal currents are stronger along the northern shores of the Archipelago than they are along the South coasts, and the stream of flood is stronger than the ebb. At Port William, the easternmost harbour, the time of high water at full moon is 5^h, and thence westward the times increase gradually to 8^h 30^m at New Island, which is nearly the westernmost of the group.

"Generally speaking, the sea is much deeper near the southern and western shores, than it is near those of the North; and to those local differences I attribute the varying velocity of the minor tide streams." *

III.—OF THE CURRENTS.

(146.) The phenomena of Ocean Currents present to our view one of the most mighty agents in the distribution of climate and other effects in operation on our globe. Their nature, however, is not generally well understood, the subject having remained for many years nearly stationary from the days of Major Rennell, with whom it originated. The Currents of the North Atlantic have naturally received the greatest attention, and several difficulties were encountered in forming an entire system upon the data collected in that part of the ocean. However by extending the investigation to other areas, and especially to the Pacific, which till recently has had but little attention, we are enabled to supply some deficiencies in this.

In our "Directory for the Pacific Ocean," and in that for the "Indian Ocean," we have described the tropical currents of those great oceans, and demonstrated that the great westerly drift becomes broken up, and enters the Oriental Archipelago through the numerous channels dividing the islands, and thus becomes neutralized as to its westward set. We may, therefore, suppose that the open spaces in this archipelago will have a higher temperature than the rest of the ocean, and also be the initial point of the great current systems which circulate around the Indian and Atlantic Oceans.

A continuous current may thus be traced from the Indian Archipelago, between Timor, &c., and Australia, across the Indian Ocean, and nearly surrounding the globe, across the Atlantic to the shores of Britain, and into the Arctic Sea.

(147.) This mighty circulation, which is described in the Journal of the Royal Geographical Society, Vol. XXIII. 1853, is similar to what is going on in the Pacific, and their combined effects present one of the grandest features of nature, and the importance of which cannot be too greatly appreciated by the mariner.†

(148.) A very brief notice of the general system may be here given, to elucidate the subsequent details. The revolution of the earth and the solar heat causes the phenomena of the trade winds within the tropics. These blow from N.E. and S.E., meeting near, but *not on*, the Equator, a fact due to the unequal distribution of land and water in the two hemispheres. The line of junction is thus to the North of the Equator, between lats. 4° and 10° N., as shown in (11), page 37, and on page 48, &c.; and this belt of calms is the well-known obstacle to ships crossing it in the Atlantic and in the Pacific North or South of the tropics, or of lat. 30° North or South. The winds blow from the westward, with almost as much regularity as those from the eastward within the tropics, more especially beyond the influence of the land.

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* Voyages of the Adventure and Beagle, vol. II. p. 241.

† See also Journal of the Society of Arts, May 20, 1853, pp. 301—304.

(149.) To the direction of the wind that of the *surface* current (with which the sailor has only to deal) is owing. And in each ocean it will be found that the waters circulate around it on the parallel of 30°, flowing westward between this and the Equator, and eastward between it and the poles; and towards the Equator on the eastern sides of each ocean, and from it on the western.

(150.) Thus the circulation around the basin of the Ethiopic Ocean is first to the westward, around the Cape of Good Hope (the Agulhas Current); then northward along the West Coast of Africa (the South African Current), up to the Equator; thence westward across the ocean (the Equatorial Current), a portion passing along the North Coast of Brasil, into the Mexican Sea, and emerging thence in the well known Gulf Stream; and the other branch passing southward down the coast of Brasil (the Brasilian Current), whence turning to the eastward it re-enters the Indian Ocean, South of the Agulhas Current, as the Southern Connecting Current. These separate branches will be described, and will be found analogous to those existing in other oceans.

(151.) The numerous observations on the temperature of the different currents which have been made and collected of late years, enables us to indicate the sources and progress of these well marked streams with tolerable certainty; and their general contour, as given in the chart illustrating this section, may be taken as an approximation to an exact portion of their various courses. A few words on the surface temperature of the ocean will be given hereafter.

(152.) The currents of the Atlantic Ocean, northward of the Equator, in connection with those to the southward of it, have been explained in the *Memoir, &c.*, on the North Atlantic Ocean.

The prevalent currents of the Ethiopic Ocean may be briefly enumerated.* That remarkable feature of the ocean, commonly called the AGULHAS CURRENT, which is generated by the great drifts of the Indian Ocean, both eastward and westward of Madagascar, flows westward, and sets over the edge of the great Bank of Agulhas; whence, passing the meridian of the Cape of Good Hope, it spreads both to the North and West, and a branch or off-set rounds partially to the S.W., South, S.E., and East, as shown hereafter.

The SOUTH AFRICAN CURRENT, a cold stream, called by Major Rennell the *South Atlantic Current*, is a continuation, northward and north-westward, of the Agulhas Current, though, as will be seen, of different origin; it sets in the direction of the African coast, and nearly parallel thereto, until it has passed the latitude of the River of Congo (about 6° S.), beyond which it has a decided north-westerly course, until it blends and unites with the *Equatorial Current*, between the parallels of 1° and 5° South; and this united stream sets to the West, W.N.W., and N.N.W. (with a great off-set or drift to the North, N.N.E., &c., during the African S.W. monsoon), as described in our former work.

When this South African current has followed the direction of the coast to the northward (in a reverse direction to the stream which is found on the same parallels on the East side of Africa), and having attained the latitude of the islands in the Bight of Biafra, it turns to the westward, and joins the great tropical drift.

To the North of this, between it and the Guinea Coast, the GUINEA or EQUATORIAL COUNTER CURRENT, or the AFRICAN CURRENT, which is a singular phenomenon of a current running in a reverse or eastward direction, between the region of the North-east and South-east Trade winds, and this is found at times, as will be seen, to extend easterly across the ocean, and as far eastward as Fernando Po.

The central part of the ocean, North of the tropic of Capricorn, is under the immediate influence of the S.E. trade wind, which impels its surface waters to the westward. This immense drift sometimes reaches nearly home to the Brasilian shores; but on approaching those shores it appears more frequently to form a current, setting in a counter-direction along shore to the *southward*, and which is said to have been traced nearly from Pernambuco to Tierra del Fuego; but circumstances prove that it is variable, and always modified by the prevailing winds.

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* This explanation will be clearly understood by referring to the illustrative chart of the currents.

From the River Plata there is commonly a great outfall of fresh water, which has been traced many leagues to the eastward, and which is lost in the variable currents found between the westerly or central drift, on the North, and a wide *easterly* current commonly prevailing between the parallels of 30° and 35° to 40° S.* The last which has been denominated the SOUTHERN CONNECTING CURRENT, greatly facilitates the passage of ships bound to Australia and to ports of the Indian Ocean, and is a portion of that great eastward drift of the Antarctic Current.

On the parallels South of the Connecting Current the great drift of the Antarctic waters, when not disturbed by local winds, appears to be in a north-easterly or E.N.E. direction. We find it thus at a certain distance from the S.E. coasts of Tierra del Fuego and of the Falkland Islands, a consequence of the more prevalent winds, which are westerly. As in the Arctic or Northern Icy Ocean the great flux of water is from N.E., so in the Antarctic it is from the S.W. or W.S.W., setting to the N.E. and E.N.E. to the meridian of 60° E., and probably much further in that direction.

The particular details are as follow, taking the Currents in the order above-mentioned.

1.—The Agulhas Current.

(153.) This current has been described as a perennial or constant current, which sets into the Atlantic Ocean round the entire southern extremity of Africa, or territory of Good Hope. It varies in its velocity, in different situations and at different periods, from 5 miles to 1 mile an hour. Ships have been frequently carried to the westward, quite round the Cape of Good Hope, even against the strongest N.W. gales, by this current; in such case the sea breaks so short, that is, the waves are so high and close to each other as to occasion much strain upon a vessel, which, when she is deeply laden, is always dangerous, and frequently fatal.

In consideration of the operation of this current, those from the eastward must take care, in the summer months, when the S.E. winds prevail, not to fall to leeward, for it will be very difficult to gain False Bay, if a ship first makes the Cape land when to the westward of it, during a strong S.E. wind. At times, ships bound into Table Bay, have been obliged to bear away for St. Helena, in consequence of passing the Cape in the night, and being unable to beat against a strong easterly wind and leeward current.

The vicinity of the Cape is notorious as the boundary of very different kinds of weather. To the eastward of it, ships homeward bound have, in general, unsettled cloudy weather with variable winds; but so soon as they have got to the westward of the promontory, the weather commonly becomes favourable, with a steady south-easterly wind aiding the current; this may be expected more particularly in the summer season.

(154.) The setting of the current on and off the Bank of Agulhas has been a subject not previously understood, and many asserted that, at different times, this current set in contrary directions in the very same place. Major Rennell is the first who, in 1777, explained it in a manner equally ingenious and satisfactory, and he showed that the main stream of the current conforms to the direction of the edges of the bank, and not the shore, as generally imagined. The Major says, "It is universally allowed that the current runs strongest during the winter months, and all the journals I have seen confirm this opinion. It is, no doubt, influenced in some degree by the wind and other causes at all seasons, and the width of the stream may possibly bear a proportion to its velocity.

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* "In the parallel of the Rio de la Plata (December, 1823), although 200 miles from land, we were daily carried by the current 36 miles out of our course towards the S.E., so great is the influence of this mighty river at the distance of 240 miles from its mouth."—*Katzebue.*

(155.) "In the winter months, when the easterly winds are so common, the passage round the Cape will be the most speedily effected by keeping the ship in the stream of the current, and letting her drive round the Bank. I am aware that most commanders prefer keeping on the Bank, for the purpose of getting soundings, and in expectation of smoother water, and a stronger current than is to be met with farther out. With respect to the latter, which is undoubtedly the prime object, they are disappointed, as they find a help of about 4 or 5 miles per day only between Cape Delgado and Cape Agulhas. All the journals that I have examined tend to establish this fact, of which I had ocular proof during five days that I was on the Bank.

"I am indebted to Captain Waghorn, late of the Ashburnham, for the first hint I received concerning the course of the current round the Bank. He went round it in the *Liverpool* frigate, in 1764, and in five days had a help of about 160 miles between the meridians of Cape Delgado and False Bay.* The alternation of the current from S.W. to N.W., in latitude 37°, was so sudden that it marked the exact time when the ship doubled the point of the Bank."

(156.) The particulars of the currents, from subsequent researches, are as follow:

The two streams of current from the Indian Ocean, the one from the Channel of Mozambique, down the S.E. coast of Africa, and the other from the ocean at large, both drift-water running south-westward, join nearly opposite Point Padron, or longitude 26½ E., and probably near the edge of the Agulhas Bank, about 40 miles from shore.

These streams united, between the meridians of 25° and 29° E., form one stream, of 90 to 100 miles in breadth, which acquires a moderate velocity on the side toward the Agulhas Bank. Near the meridian of 29° it has been found to set, south-westward, more than 4 miles an hour; but more frequently 3½, 3, and 2½.

From the meridian of 25½°, the stream gradually turns to the West; its main body continuing to the border of the Bank, which extends 50 leagues, in a direction W.S.W. ½ W., whence it changes to S.S.W. The main body, or central part of the stream, appears to strike on the bank, nearly W. by S., about latitude 35½°, and longitude 23° and is immediately deflected southward to S.W. by W., and, by the time it arrives on the parallel of 36°, to S.W. It becomes S.S.W. before it reaches 37°. In 37½° it sets due South, on the meridian of 22° E.

(157.) Although the main body of the stream is turned aside, on coming upon the Bank, from its general western course to one more southerly, a large portion of it comes over the edge of the Bank, in some parts to 20 or more miles within the border, in 100 to 120 fathoms of water, and with a velocity of about 45 miles in the twenty-four hours.

The check given to the current by the eastern edge of the Bank does not turn it aside at once, but it acquires the new direction by degrees, and a considerable portion of the main stream passes over, and to some distance within, the edge of the bank; more particularly going southward, where the water on the Bank becomes deeper.

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* Cape Delgado or Seal Cape is in about 23° 20′ E.

From what is known, it has been concluded that the Bank, with a depth of about 100 fathoms, actually turns the stream as the stray current advances; when it must be inferred that its main body is, at least, 100 fathoms in depth. No other reason appears why it does not pass directly across the Bank, in the line of a slow westerly current, where the shallowest depths are from 40 to 50 fathoms.

(158.) The preceding description relates only to the main body of the stream; for it must be observed, that a large portion of it is diverted to the West and S.W., spreading in a fanlike shape over the Bank, in all directions between West and S.W. by S.; and, having crossed over to the western border, it changes its direction toward the N.W., but with a small degree of velocity compared with that of the main stream.

That part of the current which proceeds westward over the Bank, between the parallels of 34¾° and 35⅔°, appears to be formed, generally, of the northern part or border of the *main* stream, which, by passing to the North of the angle where the Bank turns suddenly to the S.S.W., avoids that opposing drift which turns the rest to the southward, and passes onward, on its original course, between the W. by S. and W.S.W.; spreading itself to nearly a degree of latitude in breadth, but with a reduction of about three-quarters of its original velocity. This, therefore, appears to be the cause of the westerly course of the current across the northern part of the Bank; while on the southern part it is generally south-westerly, as being formed of offsets from the main body of the current in its passage to the S.W., and this part is generally stronger than the northern part.

That portion of the stream which passes round the Bank, and over the deep water at its southern extremity, and finally passes along and over its western edge toward the N.W., although stronger than that which passes across the Bank, bears no comparison, in velocity, to what passes down the eastern side; being, indeed, no very large proportion of the great Agulhas Stream.

When the water of this exterior current is united with the waters which pass westward across the Bank, which takes place opposite the Cape of Good Hope, they collectively form a wide stream, running to the N.W., at the rate of 1 or 1¼ miles in the hour, and which is perceptible as far as the parallel of 25° S., where it becomes blended with the N.W. current, produced by the S.E. trade wind.

On the S.W. quarter of the Bank, between 36½° and 37° S., and between the meridians of 19° 40′ and 21°, the current appears to form eddies, or a kind of whirl; and hereabout the easterly or *Connecting Current*, from the South Atlantic, passes at no great distance from the Bank: the latter appears often to disturb, and absolutely impede, the opposite current, which sets round the Bank, being by far the most powerful of the two in this place, and it is apparently the cause of turning the Agulhas current to the eastward, after the eastern side of the Bank has already turned it from a westerly to a southerly direction.

(159.) Upon the whole it appears, from experience, that the current on the coast of Natal sets along shore to the south-westward till it unites with the Oceanic Stream on the edge of the Cape Bank, in the longitude of 27½° or 28° E., eastward of Algoa Bay. After this junction, on the meridian of Cape Recife, its direction coincides with the outline of the Bank, about W. by S., and continues thus to longitude 23½°, or thereabout, diverging a little more or less either to southward or westward; but seldom or never setting W.N.W. and W. by N., as it has been sometimes represented. In longitude 23½°, adds Captain Horsburg, the edge of the Bank has a south-westerly direction, and next *S.S.W. ½ W.*, true, nearly to its southern extremity. Here, also, the current follows its concave outline, taking a south-westerly course, in longitude 24°; and, from long. 23°, it generally sets about S.W. by S. to the southern extremity of the Bank, in 21¾° or 22° E. The velocity is greatest between 25° and 22°, along that part of the Bank which takes the most southerly direction. At the southern extremity of the Bank it seldom runs strongly between the parallel of 36½°, or to the westward of the meridian of 21° E. From hence a part seems to set weakly to the westward, and is gradually lost in the ocean; but the strongest part follows the convex extremity of the Bank, and continues to set along the western edge of it to the *north-westward*, directly toward the Cape of Good Hope. This north-westerly current seldom exceeds half the velocity of that setting to the south-westward, on the other side of the Bank.

An eddy current has also been described as setting from the shore of Cape Agulhas to the southward, the general course of which has not been clearly defined.

(160.) Thus far the stream has been correctly described by Major Rennell, who was the first to point out its features. In our recent Directory for the Indian Ocean, it is shown that the South extremity of Africa is alternately within the influence of the south-east and easterly winds during the southern summer, and of the westerly anti-trade winds during the winter, and as the line separating these two systems shifts with the seasons from northward to southward and the reverse, their line of separation is marked, especially in the winter, May to August, with those fierce gales which make the passage round the Cape to the westward, a matter of much difficulty at times.

(161.) Further researches, and especially from some observations by Captain H. Toynbee, F.R.A.S., who has defined the south-western limit of this great tropical set with more precision than has been done before. This talented officer, by close observation on the temperature and condition of the sea, especially during five voyages out and home around the Cape, from finding the constant repetition of certain facts at the same places and at the same time of year, considers that they point to some important conclusions in the physical geography of the sea. In the voyages referred to the Cape was passed to the south-eastward, on about the parallel of 40° S., in August and September, the homeward voyage near the land in February.*

(162.) In each of the outward voyages Captain Toynbee came upon a patch of very cold water, temp. 47° to 49° Fahr., in lat. 40° S., long. 3° to 7° E.; and here the current was to the S.E. The specific *gravity* throughout (a subject on which more hereafter) was 1.027. Sharp hail squalls and unsettled weather prevail in it. The following Table will give the particulars of these five voyages:—

Date.	Lat. S.	Long. E.	Current. Direction and Rate in 24 Hours.	Surface Temperature.	Remarks.
	° ′	° ′	° ′	°	
1860. Aug. 31	39 50	2 45	S. 74 E. 14	47·2	In this cold water we had ragged-looking hail-squalls; the sea kept cool to 30° 14′ S., and 14° 37′ E., when it suddenly rose 15°.
1861. Aug. 21	38 39	5 18	S. 77 W. 10	49·7	A heavy squall: the sea 8° warmer the next day.
1862. Sept. 1.	40 06	9 41	In 3 days. S. 12 E. 62	48·8	Sharp squalls: the sea 7° warmer the next day.
1863. Aug. 23.	38 18	5 20	S. 86 E. 38	51	High W.S.W. sea: the sea 10° warmer the next day.
1864. Aug. 29	39 24	6 40	In 3 days. S. 42 E. 45	50	Wind shifted to W. in a squall: the sea 13° warmer in 14° 56′ E. long.

This spot is interesting as one in which Mr. Towson argued, and Captain Toynbee in a measure confirmed (at least for this season), that hereabout the ice-drifts from the S.W. come to a standstill, and then after hanging for some time, they move off to the south-eastward. This is noticed here, as it evidently must be beyond the limit of the westerly drift of the Agulhas current.

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* See Journal of the Royal Geographical Society, vol. xxxv. 1865, p. 147 et seq.

(163.) But upon sailing further eastward on the same parallel, the warm waters of the Indian Ocean are encountered.

From this position we endeavour to steer East, keeping in about 40° S. lat., and when in about 17° E. we have each voyage suddenly come into water above 60°. By the time we get to 23° E. long. we have our warmest water, sometimes up to 67°; but the most remarkable part of it is, that we pass through *streaks* of hot and cold water, although sailing in the same latitude. This kind of remark is very common in my logs:—9 a.m., long. 18° 20′ E., surface-water 55°. 3 p.m., surface-water up to 67°. These fitful changes are quite the order of the day in 40° S. lat., from the meridian of Greenwich to 50° E. long., where we have each voyage come into a colder patch of water, sometimes down to 40°. In the changeable water we have a very high confused sea, and in this colder patch frequent hail-squalls. The current is generally to the eastward, seldom exceeding a mile an hour; though once in 24° E. long., whilst passing from water at the temperature of 66° down to water at 56°, we experienced an easterly current of 80 miles in 24 hours. (See foregoing Table.)

The streaks of warm water contain all the beautifully-shaped and coloured shells and crustaceans which we have found in the equatorial regions, whilst the streaks of cold water have a different class of inhabitants. The specific gravity of the cold water is about 1·027.

Here is the Table extracted from five logs:—

Date.	Lat. S.		Long. E.		Current. Direction and Rate in 24 Hours.	Surface Temperature.	Remarks.
	°	′	°	′	° ′	°	
1860. Sept. 14	40	58	50	0	S. 76 E. 25	44·5	This was at 6 a.m., having fallen 17° since 8 p.m. of the evening before, with so confused a sea that we had rolled a main top-gallant mast away; by 9 a.m. it was 54·5°; and at 3 p.m. on the 15th it was 47·3°.
1861. Aug. 31	40	2	52	35	E. 64	45·8	The day before the sea was 59·5°, and the day after 59·2°.
1862. Sept. 9	41	24	41	0	N. 55 W. 9	44	After running about 300 miles to the eastward the sea was 56°; and after 90 miles more to the eastward it was down to 44° again.
1863. Aug. 31	40	15	43	40	N. 75½ E. 10	46·2	At 8 p.m. of the 30th, only 100 miles further W., it was 61°; and at 8 p.m. of the 31st, about 100 miles further E., it was 60°, and a heavy N.W. gale blowing.
1864. Sept. 11	42	50	47	50	Easterly.	40	The sea had been below 50°, from 32° 16′ E. long., with foggy weather: on the 12th, at 3 p.m., it was up to 58°. In this cold water we had a current of a mile an hour to the eastward.

(163.) It seems most probable that if it were not for the rush of warm water from the Indian Ocean down the Mozambique Channel, the large masses of ice which are known to travel to the north-eastward, and to come so near the Cape of Good Hope, would travel further on the same course, and render the passage round that Cape much more dangerous than it is. Further, there seems reason to suppose that this ice-bearing current divides into two, part of it supplying the remarkably cold water which is found in Table Bay, and then running North, forms an equatorial current of so low a temperature as 70°, the other part carrying the ice which Towson finds crossing the meridian of Greenwich in a south-easterly direction. This ice is most probably fended off by the cushion of warm water, and being obliged to work round its southern edge, travels to the north-east again, forming another curve East of the Cape of Good Hope, like that which Towson gives East of Cape Horn. But thanks to the influence of the warm water with which it is in contact, much is wasted away before it gets North of the Crozets; still, Towson gives several icebergs on that spot, and I have once met with them there myself, while the very cold water which we *always* find there shows that something of the kind must happen. If the ice does incline to the North after dipping to the southward round the warm water off the Cape, it supports Towson's theory, that there is as much ice to be met with in lower latitudes as in 51° S. lat. So that 52° is the best latitude to choose as the southern limit for going to Australia.

(164.) A general summary of the subject, as derived from Captain Toynbee's observations, is thus given by Comm. C. George, R.N., who projected his data:—

Off the Cape of Good Hope the two currents meet near the parallel of 39° S. and the meridian of 20° E., but the line of meeting may alter along that parallel in different seasons. The apparent effect of the junction of the warm and cold currents is to drive the latter about two degrees further to the southward, and also to divide each of the currents into two parts: some portion of the cold current is turned to the northward, and by its specific gravity it runs under the warm current, strikes the western side of the Agulhas Bank and comes to the surface near Table Bay, where its temperature is 52°, while at 60 miles off the shore the warm current is running north-westerly at a temperature of 68° to 70°—a difference of 16 to 18 degrees. At this meeting of the currents the greater portion of the warm current continues to flow to the westward, between the Cape and the parallel of 39°; while some portion of the warm current is here turned, and carried to the eastward by the cold or ice-bearing current, which, after sending off a portion towards the Cape of Good Hope, continues its easterly direction along the parallels of 40° and 42° S. The cold stream, after passing Table Bay, continues to run northerly along the West coast of Africa, and its existence has been noticed by T. Baines, Esq., F.R.G.S., at Walvisch Bay, in latitude 23° S., where he found the water so cold and bracing as to be almost unpleasant for bathing, in the same year as the observations were made by Captain Toynbee at the Cape.

That the boundary of the cold water remains somewhat stationary, as noticed by Captain Toynbee, during the months of August and September, is supported by the fact that it was found in the same locality for four consecutive years, viz., between the parallels of 39° and 40° S., and between the meridians of 4° and 6° E.; also that the warm current follows the same law is established, for on the same parallel and near 15° E., the warm current is encountered and found there during the five years of examination, and in like many other places. After passing the meridian of 25° E., the cold current is pushed 2 degrees further South, and still running to the eastward carries the warm surface-water with it.

The Tracks, Winds, and Weather, over the Bank of Agulhas, are described hereafter.

2.—The South African Current.

(165.) The SOUTH AFRICAN CURRENT sets, as already noticed, along the western coast of Africa toward the equator, where it is connected with the equatorial stream. On the parallels of Angola and the River Congo it exists as a powerful and very extensive stream, setting to the north-westward and westward, along the equator, whilst the *Guinea Current*, from the North Atlantic, meeting it, passes *within*, and nearly brushes in its way to the Bight of Biafra, where it terminates, being barred up by the lands to the eastward, as shown in the " Memoir," &c., on the Atlantic Ocean.

(166.) The South African Current is analogous to the Peruvian or Humboldt's Current, which runs to the northward along the West coast of South America. The Peruvian Current is a prolongation of the Antarctic easterly drift (the equivalent to the Southern Connecting Current in the Ethiopic), but which is there intercepted to a greater degree by the greater southerly projection of the American continent. With this exception the features of the two currents are similar, and they supply similar places in the circulation of the two oceans.

(167.) Captain Toynbee writes:—

The water on the Agulhas Bank and in Table Bay is remarkably cold, showing that its source is not the Mozambique current. Laying at anchor in Table Bay in February (the corresponding month to our August), we found the water down to 51° (the same temperature as we found at the entrance of the English Channel in March), when the day before we entered the bay in 35° 16′ lat. and 22° 54′ E. long., it was 70·5°; and four days before, in 33° 15′ S. lat. and 30° 40′ E. long.. it was 78·3°. Again, after running 90 miles due West from Table Bay, the temperature of the sea rose 19°. We may naturally conclude that Table Bay gets cold water from this ice-bearing sea, and that the same water runs northward along the West coast of Africa, and forms the Atlantic equatorial current, and is also one of the causes of the dampness from which the West Coast of Africa suffers. No doubt the inhabitants of Cape Town are benefited by the cold water of Table Bay in several ways; one may leave the town overcome with heat, and find the temperature of an English March on board a ship at anchor in the bay. They may also thank it for the abundance of fish which may be had just for the taking. When lying there in February of this year, my crew were hauling in large crawfish almost as quickly as they chose, and the fishermen of the place beating about were catching snook (*Thyrsites Atun*) in the same profusion, making the whole bay a scene of most picturesque and enlivening interest.

One can scarcely avoid contrasting the climates of Natal and Cape Town. The former is said to abound in tropical productions which will not grow at all in the latter. No doubt the cause of this is that Natal has a current of a temperature of 78° running by it all the year round, while Cape Town is surrounded with a cushion of cold water down to 51° in the height of summer.

(168.) Unfortunately, we have not many direct observations for the temperature of the sea on the West Coast of Africa to the northward of the Cape. Capt. Maury's charts are a blank hereabout; therefore this direct proof of the origin of the current is here wanting. But inferentially its course may be affirmed with certainty. It has been noticed before that the water in Walvisch Bay, nearly under the tropic, is so cold as to be almost unpleasant for bathing, and we know that the northerly current is very persistent thus far.

(169.) There is another evidence from the sea temperature. The lines of equal temperature (isothermal lines) as that of 70° Fahrenheit, do not follow the same parallels, or run East and West as might be theoretically supposed, but from the Cape of Good Hope they assume a general north-west direction, having cooler water to the eastward. The effects of this current may also be traced in the contour of the sand-banks and peninsulas on this coast of Africa. They all trend to the N.W. from the general line of the shore.

(170.) Of its rate or extent we are also in some doubt, but that it reaches the southern limits of the Bight of Biafra, as before stated, there can be little doubt, and its western margin is very undefined, as it merges gradually into the great western drift impelled by the S.E. trade winds, assuming the general direction of that great aerial current, while the surface-waters eastward of the line joining the Cape of Good Hope and Cape Verde, see (22), on p. 41, &c., are impelled to the northward and toward the land by the African monsoon.

3.—The Guinea Current.

(171.) This singular current, the origin of which does not appear to have been properly explained hitherto, is a band of current setting to the *eastward*, against the usual course of the trade wind and tropical drifts, along the Guinea Coast, quite up to the Bight of Biafra. It has been shown in the Directory for the Pacific Ocean, Part II., 1st edition, 1852, that there exists a similar current, which runs across the entire breadth of the great ocean, between lat. 4° and 10° N. of the equator, almost or quite up to the Bay of Panamà. From the fact of this *counter current* being to the North of the equator, or in the zone where the N.E. and S.E. trade winds meet and neutralize each other, it is fair to infer that it is formed by similar causes; the drifts from each trade wind here meeting and forcing the waters to return upon their previous set. That Major Rennell's supposition, that this is a prolongation of the set down the coast of Morocco, &c., is not the correct one, may be inferred from his own charts and other observations (see those of the Baron Roussin, given hereafter), and is of the same nature as the Pacific Counter Current.

(172.) As this current more particularly belongs to the North Atlantic, it is described at greater length in our Directory for that ocean, 12th edition, 1865, pages 283—288, and numerous examples are there given of its having been met with on the western side of the ocean off the North coast of Brasil, and from this it is traced across to the eastward to that part where its existence and character have been long known.

(173.) It is needless here to quote all that is there said, but it may be briefly stated to occupy, with more or less regularity, all the space which lies between the N.E. and S.E. trade winds, as described on page 47, &c., ante, and thus to aid vessels which cross the equator on the westesn meridians, from being drifted too far to the westward to clear Cape San Roque.

(174.) One of the most remarkable examples of this easterly current recorded, and one which unmistakeably demonstrates its existence and activity, was encountered by John Alexander Mann, Esq., F.R.G.S. and F.R.A.S.* He left Cayenne in French Guiana, in the brigantine *Monte Christo*, 120 tons, bound for Paranahyba, on July 26, 1862, the day of the new moon; the wind blowing from the East. A direct northerly course was steered until the 30th, when the ship was in 7° N., and the log, by dead reckoning, was the same as Cayenne, *i. e.* 52° 14'. On August 7th, spoke the Austrian brig *Rarita*, which gave longitude 27° 14'; that of the dead reckoning of the *Monte Christo* gave 42° 14', so that the vessel had been drifted *nine hundred miles* to the eastward, and for eight consecutive days she had been drifted $3\frac{1}{2}$ knots an hour to the E.S.E. There was a great doubt as to the accuracy of the longitude, but at noon of the 15th, in lat. 0° 45' S., they spoke a Dutch brig, which gave the longitude as 27° 8', while the D.R. placed them in 44° 0', which, compared with the position on the 7th, shows that they were drifted 120 miles further to the eastward. In fact, had the ship been left to the current, it would have soon reached the African coast, having drifted 1,020 miles in 20 days.

Throughout the remainder of the voyage, which lasted 14 days longer, the same current was experienced. The captain of the *Loyal*, which arrived some days after, abandoned his chronometer from the same cause, believing it to be out of order. Afterwards, in sailing from Surinam to Cayenne, in the *Alecton,* French man-of-war steamer, Mr. Mann met with the same phenomenon.

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* See Proceedings of the Royal Geographical Society, Vol. VII., 1863, pp. 50, 51.

(173.) These facts are very important, in connection with the westerly crossing of the equator, now strenuously advocated, and the influence of this powerful current, which appears to have much constancy during the northern summer months, may have much to do with the readiness with which vessels, having reached too far to the westward, contrive to weather the eastern extremity of Brasil. This will be adverted to hereafter.

(174.) The easterly current thus passing across the Atlantic strikes the coast of Africa about Sierra Leone and the coast of Liberia. Of course, when near the shore, it assumes its direction to the S.E., and runs with great velocity. As is shown by the Chart of the Currents, at page 259, its mean annual velocity is between 14·1 miles and 25·5 miles per day, strongest in the summer months.

Its mean direction off Cape Palmas and Cape Coast Castle is E. 12° N., and its calculated velocity from Major Rennell's and Maury's observations is—for January, 17·4 miles to 27·6 miles; February, 26 miles to 32 miles; April, 11·5 to 33·7 miles; May, 22·7 miles to 36 miles; June, 30 miles; July, 18·2 miles; August 15·7 miles to 26·4 miles per day. These are from the records of 75 observations.

(175.) Its southern edge appears to be in about 2½° to 2° N. up to the head of the Bight, and as the southern streams set in an opposite direction, they are serviceable in making a return passage as presently explained.

The temperature of the Guinea Current is high, and demonstrates its equatorial origin, although the branch of it which comes from the northward past Cape Verde has probably a lower temperature as coming from a higher latitude. The equatorial current to the southward of the Guinea Current is also of a lower temperature, coming direct along the African coast from the southern polar regions. The mean summer temperature is about 78°, but in our winter and autumn months it is higher, being from 82·6 to 83° as a mean, and sometimes it is found higher than this.

(176.) At the distance of about 59 leagues South of Cape Palmas (long. 7¾° W.) the outer boarder of the Guinea Current sets to the East, and the same direction of it continues to a similar distance South of Cape Three Points (long. 2° W.); we thence, at 2° North of the Line, find it take a more northerly course, toward the Bight of Benin and the Bight of Biafra; in the latter it mixes with the waters of the *South African Current,* which, coming from the South, set thence to the North and N.W., and, both uniting, form a head in the bight. From this bight and southward of the equator the currents thus blended set to the S.W., W.N.W., and N.W., in one expanding and united stream, which greatly facilitates the passage of ships from Fernando Po to Sierra Leone.

Near Cape Mount the current, in general, sets in upon the shore, and on the West of Cape Palmas, about a point from the shore, running with considerable violence round the Cape. The general direction between Cape Palmas and Bonny, or the Bight of Biafra, is easterly, varying in velocity from 12 miles in twenty-four hours to 30 miles in the same time. From April to September the current runs with the greatest rapidity to the eastward; but, from the latter end of September to March, it sets occasionally to the westward. The Harmattan Wind is also accompanied by a westerly current, and a tornado gives an impulse to the water in the same direction, which frequently continues during a day or two afterwards. In the Bight of Biafra the easterly current is met by that from the southward, as noticed on page 27; the united streams then run to the S.W. and westerly, as explained in the "Atlantic Memoir," 12th edition, p. 287, and which southern tendency is subject to considerable variation, from the effect of the periodical winds, &c.

(178.) Lieutenant Brito de Capello, of the Portuguese navy, whose observations on the winds on the African coast, are given on pages 42—47 has extended his enquiries into the nature of the currents. From the same work we extract the following on our present subject.

In *December*, *January*, and *February*, the Guinea Current is felt as far as 23° or 25° W., and further; and runs to E. and E.N.E. between the parallels of 3° and 5° N., joining the current which comes down from the northward along the African coast. Its axis, or the portion where it is strongest and most regular as far as Cape Palmas, is between 3° and 4° N. Its southern limit runs from 3° N. on the meridian of 24° W. to 2° N. on 2° E. Its velocity is then about 1 knot, rarely reaching 1¼ mile per hour. To the West of the islands of St. Thomas and Anno Bon there seems to be a whirl or conflict between it and the South African current, meeting it from the southward. Near the coast, between Cape Lopez and the mouth of the Congo, there is frequently a counter current.

(179.) To the South of Cape Lopez, and at a considerable distance from the coast, the water frequently sets to the South, S.E., or East, and Lieutenant Brito de Capello has examined into 138 instances of this, and finds that the abnormal set of the stream is dependant on the moon's age. From the last quarter to new moon there were 49 instances; from new moon to first quarter 36; from first quarter to full moon only 17; from full moon to last quarter 36 occasions. This reverse current thence gradually increases from the full moon to the last quarter, and attains its maximum in the three days which follow the last quarter, then diminishes, and afterwards attains a second maximum about the time of the new moon. There is, therefore, evidently some connection between the tides and this reverse of the usual current.

(180.) In *March* and *April* the Guinea Current is less regular and powerful than earlier in the year. In *May* and *June* the equatorial current is at its maximum strength and greatest regularity in the neighbourhood of the Guinea Current, which is irregular and uncertain at this period, but is usually met with between the parallels of 3° or 4° to 7° or 8° North. In *July*, *August*, and *September*, the Guinea Current is increasing and sets, in its western part, to N.E. and E., or toward the land. Its southern edge is very well defined by a line passing from 5° N. in 28° W., to the meridian of 5° W. on 1° 30′ N., which also divides it from the equatorial current. Its rate is usually 1 mile per hour. Near Cape Palmas, where it is more regular, its mean rate is 1¼ mile. In *October* and *November* the different currents are most irregular in these parts. The North African Current, when it reaches the latitudes of 9° or 10° N., runs to S. and S.S.W., but is much complicated by variable counter currents. The Guinea Current, which is found South of 8° or 9° N., runs generally to N.E. and E.N.E., but is not well defined westward of 24° W. Its southern edge is much more southward in the Gulf of Guinea, and its velocity is about the same as at other periods.

(181.) This is all that need be said on this peculiar current, which has such great influence on the navigation of the West Coast of Africa, as is shown hereafter. The illustrative charts will afford further information.

4.—The Equatorial Current.

(182.) The great tropical drift, caused chiefly by the S.E. Trade wind, is not well designated by the usual term of the equatorial current, which more properly belongs to that just described as lying on the (meteorological) equator. According to the usual definition it is that great moving mass of waters which is limited on the North by the Guinea Current, and on the South by the Antarctic drift current, having in fact the same area as that occupied by the S.E. Trade wind, and in some degree obeying the same laws.

(183.) On its eastern side it commences with the South African current, that northern stream which sets up the West Coast of Africa as far as Cape Lopez and the Bight of Biafra, the western edge of which is not well defined, but merges gradually from its N. and N.N.W. direction to a more westerly course.

(184.) In mid-ocean, where its rate and persistence are the most marked, it may be always reckoned on, and its mean velocity will be found varying from 10 to 15 or 20 miles per diem. Sometimes it is greater than this. In its northern part its rate is greater, sometimes attaining 1½ to 2 knots per hour. Its southern limit is very undefined in mid-ocean, both from want of collected observations as from its uncertainty, but more will be said on this when the Antarctic Currents are treated of.

(185.) Arrived on the American side, this great drift becomes subject to the modifications caused by the wind of the coasts it impinges on. In the northern part it sets strongly past the N.E. point of Brasil, and along its northern coast, and is considerably altered, varying with the seasons, as it passes down the eastern coast.

(186.) As this part of the ocean is very important to navigation, since a more westerly crossing of the equator, in passing from the North to South, has been adopted, and it is very desirable that it should be properly understood. Capt. Maury has especially insisted that there is no danger of being horsed to leeward of Cape San Roque by westward currents with a well handled ship.

(187.) He says: At any rate, if the worst comes to the worst, and you have to go into a dead beat, you might as well undertake it near St. Roque as in mid-ocean, for I refer each navigator, not to tradition, but to his own experience, and to the hundreds of abstracts that have been quoted in this and previous editions of this work, to sustain me in the assurance that there is no current between the line and St. Roque which any seaman who knows what to do with his ship, and who has a ship worthy of him, need fear. Still, notwithstanding all this array of facts, notwithstanding we challenge any navigator to give us any authority or evidence in favour of *dangerous* currents about St. Roque beyond the alarm raised by hydrographers, because some English transports were wrecked there in the last century: I say, notwithstanding the shipmasters cannot adduce any proof in favour of these terrible currents, the belief in them is so common and deep seated in the minds of mariners, that many, as the abstracts I have quoted will show, are in fear and trembling of these currents of fabulous power when they find themselves on the equator as far West as 30° or 31°. The fear which seamen have been taught to entertain of St. Roque and its currents remind one of the dread with which the ancient mariners regarded the Sirens; and all that is wanted to break this modern spell is the daring of Ulysses.

An English transport of the last century could not sail over 5 knots, with a favourable wind, at best; and what could she do in turning to windward any-where in a sea-way, whether there was any current or not. Of course if such a vessel fell to leeward of St. Roque, she was back-strapped with a vengeance. She never could get round. But this is not the case with modern ships. Between the line and St. Roque a current of 1 or 2 knots to the northward and westward is sometimes met with. But what is such a current to a long-legged ship of the present day?

(188.) This and other similar remarks have been apt to throw the mariner off his guard as to the velocity of the equatorial current here, and therefore we repeat what has been given in former editions, that in the vicinity of Fernando Noronha and the St. Paul's Rocks, it has been found to run at 2½ miles an hour, and that off the N.E. projection of Brasil a still greater rate prevails at times.

From disregarding the silent effects of this westerly drift, many sad wrecks have probably occurred of late years, for during the late surveys the remains of many were found on Las Rocas. One especially deserves notice, that of the *Duncan Dunbar*, a fine ship of 1,300 tons, which was drifted on to that treacherous coral reef, on the night of October 7th, 1865, becoming a total wreck, but the lives of her 117 crew and passengers were saved.

(189.) From some remarks which were publicly made at this time, the Hydrographic Office issued the following:—

As many recent navigators have in practice adopted a more westwardly route for crossing the equator than prevailed in former years, it appears desirable that the facts accumulated as to the general correctness of the foregoing description, and especially as to the direction and strength of the currents in the vicinity of the Rocas and Cape St. Roque, should be brought to the notice of seamen briefly and clearly.

The East India ship *Britannia*, and *King George*, transport, were wrecked on the Rocas at 4 a.m., November 2nd, 1805, when the current set at the rate of 2½ knots to the eastward.—*Brasil Pilot*, 1818, p. 31.

Lieutenant-Commander Lee, in the U.S. brig *Dolphin*, was employed 14 days in March, 1851, sounding near and surveying the Rocas and their vicinity. He states, "the current in the vicinity of this reef sets from between S.E. by E. and E. by N., at the rate of from $\frac{8}{10}$ to 1½ knots per hour. The surface current found by trials on four different days sets from between S.E. and E. by N. from $\frac{8}{10}$ to 1 $\frac{4}{10}$ knots per hour. At our anchorage under the lee of Sand Island the tide ran from $\frac{2}{10}$ to $\frac{8}{10}$ knots per hour, setting from between S.S.E. and E. by N. towards the northward and westward;" also, "the current between the Rocas and the Main sets generally from the southward and eastward from 1 to 1½ knots."

In March, 1856, H.M.S. *Sharpshooter*, Lieutenant-Commander Parish, anchored near the Rocas, and at the suggestion of the British Consul at Pernambuco, planted several cocoa-nut trees. In this officer's remarks he states, "We found the current to set W.N.W., true, between 1 and 2 miles per hour."

On the 12th of November, 1856, in the afternoon, the ship *True Britain*, in passing the Rocas, and observing signals of distress on the shore, endeavoured to communicate and render assistance by boat, but from the strength of the current was unable to do so from the ship being swept to leeward so fast. On the 13th of November, it is stated, "found that the ship during the last 24 hours had been set to the westward 60 miles. On the 14th of November, find that the ship has been set to the westward 36 miles during the last 24 hours."

In 1858, Commander J. H. Selwyn, in H.M.S. *Siren*, visited the Rocas and erected a temporary beacon. He states that the "anchorage is fair and protected from the prevalent swell from N.E. to S.E.," and "from its situation in the heart of a westerly current, which varies in force from 1 to 2 miles, and its comparative vicinity to the mainland, a lighthouse would be most valuable to the mariner, as a means of ascertaining his position with certainty."

Numerous other isolated examples of the westerly current prevailing near this reef will be found in published works; but the following analysis of the registers of 930 ships, which have been deposited with the Meteorological Department of the Board of Trade, between 1856 and 1865, will doubtless be deemed sufficient.

Of these 930 ships passing from the North to the South Atlantic Ocean, 12 passed within a distance of 30 to 40 miles East or West of the Rocas at various seasons of the year. Of these 42, 14 do not record whether they have experienced any current or not. One experiences "a strong westerly current," and was "driven back." The The remaining 27 found currents of the following direction and rate.

11 vessels were set West:—4 of these from 48 to 24 miles, and the remaining 7, from 20 to 10 miles a day.
8 " W.N.W.:—4 of these from 51 to 30 miles, and 4 from 29 to 21 miles a day.
5 " W.S.W.:—3 of these from 48 to 30 miles, and 2 from 20 to 10 miles a day.
1 " S.W.:—40 miles a day.
2 " North:—42 to 8 miles a day.

The strongest of these 27 recorded currents were found in June, July, August, and November.

5.—The Brasilian Currents.

(190.) On the eastern coast of Brasil the Stream Currents, formed as already noticed, are varied according to the direction of the winds or monsoons, and the inclination of the coast. The Baron Roussin says, "As the winds do not impede the navigation of these coasts, neither do the currents. They generally follow the winds, according to their force and direction; for there is no river between Maranham and the Isle of St. Catherine powerful enough at its mouth to carry with it any sensible motion into the sea to more than 1 or 2 leagues from the coast. The winds are variable, so are the currents; their change is very quick. In these warm seas the waters are very clear. and they are disturbed by the first impulse given them. At the end of twenty-four hours, if the breeze be strong, you may observe a current running in the same direction. After a great number of observations on the currents, we have estimated, more or less, their velocity along the coast, from the Island of St. Catherine to Pernambuco, at six-tenths of a mile an hour in the two monsoons; it is often under that quantity, rarely above it, sometimes nothing. The velocity of the currents is more considerable in the southern monsoon, than in the northern, because the wind is stronger in the first instance than in the other.

"But the velocity varies on different parts of the coast. Between the parallel of the Island of St. Catherine and that of the Abrolhos, or 18° S., and from 2 to 10 leagues from land, the current is hardly to be discerned in any season. From the 18th to the 11th degree the waters carry you to the N.W. during the southern monsoon. From the 11th to the 9th degree, in proceeding northward, the waters carry you to the northward with greater velocity, which increases at times to the rate of 36 miles in the twenty-four hours, and is seldom less than 20. To the N.W. of Cape St. Roque it sometimes sets at the rate of 48 miles per day, the waters running W.N.W. in the direction of the coast.

"On passing Pernambuco, and in following the land to the northward, the currents and monsoons can rarely have any influence of consequence to navigation. More to the southward their effect is greater, and they may be considered as tides; these, again, are not important, as they do not extend far from land, and only affect vessels going to the small ports or creeks on the coast. Most of the great ports are subject to the regular tides.

"Adverting to what has been said on the winds and currents off the coast of Brasil, we must conclude, first, that between the Isle of St. Catherine and Olinda, or Pernambuco, there is no permanent obstacle against navigation; and the recommendation to make the land to windward of the place you are going to, is a matter of precaution to preserve yourself from all disappointment. Secondly, from the Point of Olinda, all along to Cape St. Roque, and thence to the Isle of Maranham, prudence dictates that you should keep to the eastward of the point you would arrive at, after compensating in the track the effect of the currents carrying you to the W.N.W."

(192.) Captain Hewett says, "During the southerly monsoon the currents to the southward of Cape St. Augustin are not so powerful as to the northward, where they increase in strength until the months of June and July, and then gradually decline. On the contrary, in the northerly monsoon they are generally very strong to the southward of Cape St. Augustin, when they are weak to the northward, as they have some difficulty in detaching themselves from the stream which runs from the S.E. trade around Cape St. Roque."

Mr. Lindley also notices that "A strong current runs southward from Cape St. Augustin, commencing about the middle of October, and continuing until January; after which there is no particular current till the middle of April, when a powerful one sets in northerly till July, and then subsides in like manner."

The southern tendency of the current was felt in proceeding from Fernando Noronha to Bahia, by Captain FitzRoy, who says, "From the 23rd to the 27th of

February, 1832, we found a current setting to the southward, between 20 and 30 miles each day. This was quite unexpected by me, for I thought we should have been set westward."

(183.) Captain Mouchez, who surveyed and examined the coast between Bahia and the Rio Plata, whose observations on the winds have been previously given (pages 55, 56), gives the following summary:—

At 40 or 50 leagues off the coast of Brasil the current generally descends, parallel with the coast from N.N.E. to S S.W., and is the southern branch of the great Equatorial Current which bifurcates on Cape San Roque. It has a mean velocity of 10 to 15 miles in the 24 hours, and loses its force as it progresses southward, and besides it varies with the seasons and force of the wind. It is scarcely sensible beyond the tropic, or the parallel of Rio Janeiro. Combined with the drift of the S.E. trade wind it frequently sets toward the land to S.W. or W.S.W.

(194.) Between this current and the land, the movement of the surface-waters is entirely dependant on the wind; if it blows twenty-four hours in the same direction, either N.E. or S.W., the current sets in with proportionate strength. Thus, during the N.E. winds, especially between October and January, the current sets to the S.W. with a velocity frequently reaching 25 or 30 miles per day. The velocity is greatest near the projecting point, such as Cape St. Augustin, the Rio Doce, Capes San Thomé and Frio, &c. Vessels at this season, making the land at Pernambuco or Bahia, should reckon on a drift of a mile an hour, and act accordingly. Many ships have been drifted 36 to 40 miles to S.W. in the twenty-four hours.

(195.) But these currents cease with the cause which produced them, and do not offer that permanent obstacle that is met with on the northern coast from the continued drift to the westward that is encountered there. With the exception of the three or four months of summer, November, December, and January, when the N.E. winds are in full strength, the currents are weak and variable. During the S.W. monsoon they are equally feeble to the northward. They are strongest in June and July.

(196.) Near the land, and under the lee of some of the headlands, as to the southward of Capes San Thomé and Frio, there are counter-currents to the N.E., although at a few leagues outside they run strongly to S.W. This is sufficiently explained by the relative direction and form of the land. Along the coast of Pernambuco near the land there is frequently a strong northerly counter current, which makes it difficult for a vessel to hold her own, if overtaken by calm when nearing the land.

(197.) It is therefore manifest that, with few exceptions, the currents do not offer any very serious difficulties to navigating in any direction on these portions of the Brasilian coasts.

(198.) At *Cape San Roque*, and along the North coast of Brasil in its vicinity, the current sets to the N.W. and W., at from 20 to 60 miles per day between March and September, but during the other part of the year at much less velocity. Some further notices on this will be found hereafter.

REMARKS ON THE CURRENTS BETWEEN THE COASTS OF GUINEA AND BRASIL,

MADE BY CAPTAIN (NOW GENERAL SIR EDWARD) SABINE, R. ART., F.R.S., IN H.M.S. "PHEASANT," 1822.

(199.) In the voyage between Cape Mount and Cape Three Points in April and May, 1822, Captain Sabine says that the *Pheasant's* progress appears to have been accelerated 180 miles by the current, called the *Guinea Current*, which, in the season when the S.W. winds prevail in this part of the coast, runs with considerable velocity in the direction of the land, from Cape Palmas to the eastern part of the

Gulf of Guinea. The breadth of this current, abreast of Cape Palmas, varies with the season, and has been found as much as 180 miles; but in its subsequent course to the eastward it enlarges to nearly 300, and occupies the whole space between the land on one side, and the Equatorial Current, running in an opposite direction, on the other. The velocity abreast of Cape Palmas and Cape Three Points, and in the vicinity of the land was, in the month of May, about two miles in the hour; and further to the eastward, where the *Pheasant* crossed its breadth, from Cape Formosa to St. Thomas's, and where its velocity had been much diminished by the dissipation of its waters, it was found to preserve a general rate of rather less than a mile an hour, and a direction a few degrees to the southward of East.

The general temperature of the stream in the mid-channel, in the Gulf of Guinea, in April and May, exceeds 84°, diminishing from 82° and 83° on its southern border, where it is in contact with the colder water of the Equatorial Current; and occasionally to between 79° and 81½° on its northern side, in the proximity of land.

In the passage between the River Gaboon and Ascension, being a distance of 1,400 miles, the *Pheasant* was aided by the current above 300 miles in the direction of her course.

The current, called the *Equatorial Current*, commences much further to the eastward than is commonly imagined; and it appears, from the later investigations of Captain Sabine, that the island *Anno Bon* is always surrounded by it; while *Prince's Island* is equally surrounded by the Guinea Current. *St. Thomas's*, being in an intermediate situation, the sea around it is occasionally influenced by both. See, farther, the description of the *Island of St. Thomas* hereafter.

In consequence of the southing of the trade wind in the vicinity of the continent of Africa, the water impelled before it, which forms the commencement of the equatorial stream, arrives from a more remote southern parallel, and is therefore of a cooler temperature than the drift-water which successively falls into it from the S.E. impelled more obliquely to the meridian, and consequently arriving from latitudes less distant from the equator. Thus the temperature of the stream varied from 72½° to 74°, whilst that of the drift current was 77½° and 78°.

But the more important distinction, both in amount and utility in navigation, is between the waters of the Equatorial and Guinea Currents. These exhibit the remarkable phenomenon of parallel streams, in contact with each other, flowing with great velocity in opposite directions, and having a difference of temperature amounting to 10° or 12°. Their course continues to run parallel to each other, and to the land, for above 1,000 miles; and according as a vessel, required to proceed along the coast in either direction, is placed in the one or the other current, will her course be aided from 40 to 50 miles a day, or retarded to the same amount.

On the BRASILIAN SIDE, from Pernambuco to Cape St. Roque, the northerly current rapidly accelerated, until, in passing the Cape, it may be considered that the *Pheasant* had entered the full stream of that branch of the Equatorial Current which pursues its way along the northern coast of Brasil and Guyana to the West Indies. Between the noons of the 16th and 17th of July she was set 44½ miles to the North, and 42½ to the West; making a general effect, in the twenty-four hours, of N. 44° W. 62 miles: probably more northerly in the first part of the interval, and more westerly in the latter, than the general effect.

On the day after the *Pheasant* sailed from Maranham, she entered the current, the full strength of which she had quitted to go to that place, and it was then found to be running with the astonishing rapidity of 99 miles in 24 hours. On the 10th of September, at 10 a.m., while proceeding in the full strength of the current, exceeding 4 knots an hour, a sudden and very great discolouration of the water ahead was announced from the mast-head: the ship being in 5° 8′ N. and 50° 28′ W. (both by observation), it was evident that the discoloured water could be no other than the stream of the Marañon, pursuing its original impulse at no less than 300 miles from the mouth of the river, its waters not being yet mingled with the *blue* waters of the ocean, of greater specific gravity, on the surface of which it had pursued its course. It was running about 68 miles in twenty-four hours.

(200.) **Remarks by Captain Foster.**—Between *Staten Island* and *Cape Horn*, lat. 54° 45', long. 63° 29', to lat. 56° 12', long. 66° 52', in four days Captain Foster found the surplus current had set N. 80° E. 11·6 miles in twenty-four hours. December, 1828.

Between *Cape Horn* and *South Shetland*, lat. 56° 18' long. 67° 28', to lat. 62° 58', long. 63° 1', in five days the surplus current had set S. 65° E., 11 miles in the twenty-four hours. 29th December, 1828, to 5th January, 1829.

Between *South Shetland* and *Cape Horn*, lat. 62° 30½', long. 62° 31', to lat. 56° 0', long. 67° 19' in eleven days of March, 1829, current N. 49° E. 21 miles in the twenty-four hours.

Between *Cape Horn* and *Staten Island*, lat. 55° 59½', long. 67° 24', to lat. 54° 49', long. 63° 18', current and *tide* N. 51° E., 54 miles in twenty-three hours; 24th and 25th of May, 1829.

Captain Foster adds, the effect which these observations appear to point out, is that of an easterly motion of the sea, in the vicinity of Cape Horn, produced, no doubt, by the prevalence of N.W., West, and south-westerly winds; and although its direction is sometimes much to the North, as well as to the South of the East, this deviation, in all probability, arises from the prevalence, or greater strength, of the N.W. or S.W. winds over each other during the intervals between the observations, as it was generally remarked that the current's deviation from the East toward the North or South point of the compass, was in accordance with the prevalence of one of these winds over the other during the above interval.

The strength of this set appears also to be much influenced by that of the winds; for, during the voyage from Cape Horn to South Shetland, it was found, at the time of meeting with N.E. winds in the parallel of 60° S., the set to the eastward was diminished in its velocity to about half the amount we had previously experienced.

From these several irregularities, the individual observations do not admit of any very satisfactory conclusions being drawn; but taken collectively, they uniformly indicate an easterly or north-easterly set, as shown above; and, on looking back, it will be seen that, in the voyage from Staten Island to Cape Horn, a current setting to the N. 80° E., at the rate of 12 miles in the twenty-four hours, may be expected in the summer months; and that, between Cape Horn and South Shetland, a current setting to the S. 65° E., of equal strength, was experienced during the same season of the year; whilst in the autumnal months this current was found to set to N. 49° E., with nearly twice the velocity; which seems to indicate that the winds from the south-western quarter in autumn are more violent and of longer duration than in the summer season: and indeed, on a review of the winds during the passages in the different seasons alluded to, it was found that the N.W., West, and S.W. winds exceeded those from all the other quarters put together, in the month of March, in the ratio of four to one; whilst in the summer months, and during an equal interval, these winds were found to exceed all others in the ratio of two to one only, which points out at once, apart from other circumstances, the most advantageous time of the year for rounding this noted promontory to be the summer months of these regions; and certainly, from the strength and frequency of the gales we experienced in the month of March, I am induced to recommend the summer season as the proper time for the navigation of these seas; particularly as, at this season, north-easterly winds may be expected in the parallel of 60° South, and which, in all probability, continue to blow in a high southern latitude throughout the summer, as we found the north-easterly wind to be the prevailing wind during our residence at South Shetland, in the months of January and February.

(201.) The next and most important conclusion to be drawn from these observations is that of the set of the flood tide round Cape Horn, which appears to come from the S.W.; such, at least, seems to be the case from the observations made during the passage of the *Chanticleer* from Cape Horn to Staten Island, in May, 1829; when, at the time of taking our departure from Cape Horn, it was ascertained to be nearly low water; and on our arrival off *Cape St. John* the flood tide had just made its mark. The passage from Cape Horn to Staten Island was performed in twenty-three hours, in which interval we had felt the whole influence of flood tides, whilst that of one ebb only had been experienced; and on comparing the ship's place, ascertained in the most unexceptionable manner, by bearing at the time of our departure from Cape Horn, and on arrival off Cape St. John with the dead reckoning, made under very favourable circumstances, viz., fine weather, a free though side wind, and the ship's way through the water measured with a self registering log, a set to the N. 51° E., at the rate of 54 miles in 23 hours, was experienced; from which, if 24 miles be deducted for the effect of the previously established current at this season, we have 30 miles for the set of the flood tide at neaps, or about 3 miles per hour, taking into consideration that, as we advance to the eastward, the flood tide is prolonged; and, on the contrary, the continuance of the ebb is thereby curtailed. How far the strength of these tides may have operated in producing some of the irregularities in the north-easterly set of the sea, deduced from the previous observations when near in-shore, by having been influenced by either tide for a longer period in the interval between the observations, I have not ascertained; but from some notes which were made at the time, I have every reason to believe that the tides caused part of the irregularities in question.

In addition to these observations, the following remarks by Captain FitzRoy will confirm the conclusions above arrived at.

"There is a current setting past the islands from S.W. to N.E.; a current which continually brings drift wood to their southern coast, and has brought Fuegian canoes. On all parts of the southern shores that are open to the S.W. the beaches or rocks are covered with trees, which have driven from Staten land, or Tierra del Fuego. Great quantities of this drift wood may be found between Cape Orford and Cape Meredith; upon the Arch, Speedwell, George, and Barren Islands: indeed there are few places between Cape Orford and Choiseul Bay where a vessel may not find a good supply of fuel. On Long Island, and in the Bay beyond the Sea Lion Islands, portions of Fuegian canoes have often been found; one consisted of an entire side (pieces of bark sewed together), which could not have been made many years. At sea, when north eastward of the Falklands, great quantities of kelp (seaweed detached from the rock, and drifting with the current), are seen, besides water-worn trunks and branches of trees, near which there are generally fish, and numbers of birds. These sure indications of a current from the S.W. have been met with upwards of 200 miles to the northward of Berkeley Sound. There is not, however, reason to think that this current ever runs more than 2 knots an hour, under any circumstances, and in all probability its usual set is less than 1 knot."—(Narrative, &c., Vol. II. p. 242.)

It has also been noticed by Capt. FitzRoy, that on the S.E. coast of Tierra del Fuego the tide is felt strongly, causing races and eddies near the projecting points. In the offing it sets strongly toward the Strait of Le Maire, from 1 to 3 miles an hour, when the water is rising on the shore and the wind westerly. While the water is falling it runs with less strength, and with an easterly wind it is not perceptible.—

6.—The Southern Connecting Current.

After the Brasilian current has reached the parallel of the Tropic of Capricorn in its southward course, it is influenced by the variable and westerly winds, which have been termed the "calms" of Capricorn; and the waters, obedient to their impulse, gradually assume a more easterly direction, and blending on their southern edge with the Antarctic drift, they form that connecting link in the circulation of the surface waters of the South Atlantic, which is in some degree analogous to that which is seen in the other oceans, especially in the North Atlantic and North Pacific, where the waters pass gradually around the area, leaving a space in the centre of of comparatively still waters. This southern branch of the circulation in the South Atlantic was termed by Major Rennell from this cause, the Southern Connecting

Current. But this is, perhaps scarcely, definite, for the westerly drift of the antarctic waters unite to form this compensative movement of the water.

This current flows eastward over the ocean between the variable drifts, &c., in the parallel of 40° S. and the S.E. trade wind, commencing in that of 25°. Major Rennell accounts for it thus: " From between 20° and 25° S. to the verge of the trade wind, the drift current on the West side of the Atlantic takes a bend to the southward through the whole space, generally, from the Coast of Brasil to 17° of longitude East from it, or about 300 leagues, which may probably be accounted for from the quantity of drift impelled to the westward by the trade wind, and which cannot reach the coast from want of room, and can escape no other way. This accumulated water, passing to the South beyond the limits of the trade wind, and consequently of the western drift, runs off to the eastward, and is consequently augmented in its way by the prevailing *westerly* winds, and by drift bending southward, becomes a large stream before its arrival at the neighbourhood of the Cape of Good Hope."

This is a part of the ocean but imperfectly known; so that, generally, between 30° and 40° of latitude, and longitudes 35° and 40° West, is nearly a blank in the chart. It is, however, known that a constant drift or slow current runs to the East or E.N.E. from the Island of Tristan da Cunha; and, indeed, every circumstance proves that there is a general motion to the East between the parallels of 30° and 40° South, and which, when it approaches the Cape of Good Hope, is a very wide and strong current, strong enough to run 2,000 miles beyond the Cape.

It has already been shown that the *Southern Connecting Current* blends with the *Counter Current* from the *Bank of Agulhas.*

7.—The Antarctic Currents.

(200.) For the present work, specially adapted for the services of ordinary navigation, it will be needless to carry the descriptions of the currents and their origin to those high latitudes, far beyond the tracks of commerce. These have been only visited by scientific expeditions specially sent and adapted for these adventures, or by a few hardy seamen who have ventured so far away from the well-frequented paths in search of whales or seals.

(201.) Unlike the other great southern oceans, the South Atlantic has no known great southern limit of land. As far as has been penetrated by Cook, Weddell, Biscoe, Bellingshausen, Ross, &c., where free from the dense masses of ice, it is open ocean. But as the constitution of the southern ice-drift differs from that of the Arctic regions, requiring a land-basis, generally, for its formation, it is fairly to be inferred, that in a higher southern point than has as yet been reached, the solid ice-bound terra-australis would be met with; otherwise the great masses of ice-bergs which are at times met with throughout its whole breadth could not be formed. In the few words which follow, only the general features of the drift which brings these immense formations within the usual routes of the vessels bound round either cape, will be given, and these will be taken from our Directory for the Indian Ocean, as equally applicable to the present subject.

(202.) From a consideration of the observations of those exploratory voyages, which have been undertaken in the summer season only, we may form some certain deductions, and we have the remarkable feature of the whole or nearly the whole of the surface-waters in a zone between 55° S. and 65° S., or the margin of the land, setting towards an impenetrable barrier, which, as far as it is at present known, encircles the South pole either in the form of stupendous ice-cliffs, or of lofty mountains descending nearly to the water's edge, without any known passage into an interior basin, or the admission of ocean influences into so large a portion of the earth's surface.

(203.) Of course, the impact of this southerly current must have some outlet, but on the surface of the waters this is not appreciated, and it is to the inferior strata of the polar waters that we must look for the necessary compensation. We have all evidence of a *northerly* set in the drifting of the enormous and deeply floating icebergs. These vast masses, so deeply immersed, can be but little influenced by the wind, and therefore it must be to current that their reaching the low latitudes they are found in must be owing. In very high latitudes, as from 70° to 65°, their progress is but slow. Estimated by Sir James Ross, in some instances not more than a mile a day; while, in a much lower parallel, Captain Wilkes estimated the progress of the drift at from half a mile to three-quarters of a mile per hour in latitude.

(204.) It is, therefore, probable that their motion is due to an under-current, which reverting from the south-easterly set (202) up to the edge of the great barrier, then turns to the North, and afterwards to the N.E. and East, forming a portion of the southern connecting current, and the effects of which are made manifest in the cold currents which are encountered on the western shores of Patagonia and Africa, and perhaps of Australia, setting to the northward along those coasts; the projection of the American and African continents being transverse to its line of direction.

(205.) This north-easterly current is an equivalent to the well-known south-westerly drift which, as is well known, prevails in North latitude, and brings the warmer waters of the tropics to the shores of Europe and America, leaving the opposite or western shores of the ocean in Tartary and Labrador, although in similar latitudes, in a climate very far colder than those under their influence. From the scanty observations we possess, it is manifest that little more can be said of their persistence and velocity than has been stated; but this easterly set may be generally reckoned on by those vessels which may venture into these high latitudes. That it exists throughout the year is manifest, from the fact that no season is entirely free from the presence of floating ice, which indicates this northern sub-surface current, drifting it to the eastward. On a subsequent page these ice-drifts will be noticed more at length.

(206.) To the southward of the region of the S.E. trade wind, and extending as far towards the icy barrier as the parallels just adverted to, there is a current running in an easterly direction all round the globe. We have several positive evidences of this apart from the detached observations of ships passing in its influence. These are afforded by current bottles, which have been of so much service in generalizing the circulatory system in the Atlantic. One of these, recorded by Captain Sir James Ross, which travelled around a large portion of the earth's circumference, and was thrown on Cape Liptrap, South Australia, proving indisputably the continuity of the southern connecting current of the South-Atlantic with the easterly drifts in the Southern Indian Ocean.

Again, a bottle was picked up on the Kangaroo Island, South Australia, in the latter part of 1863, which had been thrown overboard from the Dutch frigate *Prinses Amalia*, in lat. 39° 39′ S., long. 66° 7′ E. (or about 300 miles North of Kerguelen Land), fifteen months previously. The distance travelled was about 4,000 miles giving a rate of 9·1 miles per day.

Another bottle has formed an important link in the connexion of the currents like that quoted by Sir James Ross, by crossing a part of the ocean between Cape Horn and the Cape of Good Hope, a space almost unknown and untraversed by commerce. It was thrown overboard by Captain Tobin, from the ship *Ocean Chief*, in lat. 42° 40′ S., long. 42° 32′ W. (850 miles E.S.E. of the Rio Plata), in Jan. 1857. It was picked up at sea by Captain Williams, of the whaler *Gideon Howland*, Dec. 16, 1857, in lat. 39° 50′ S., long. 36° 35′ E., a distance of 3,850 miles in 350 days, at the rate of 11 miles per day.

(207.) These three examples will suffice to show that there is a drift of *at least* an average of 10 miles a day to the eastward, inclining to North, on the parallel of 40°, as may be derived from theoretical conclusions. The recorded experience of currents by passing ships in these latitudes is unfortunately very scanty, and it may be broadly stated that the maximum easterly drift is in about lat. 40° to 50° S. By keeping between these parallels, a vessel will be benefited to the greatest amount by their influence. Further to the North, it is probable that this drift may gradually merge into the warmer waters of the tropical current, impelled by the trade winds in the same manner as is argued for the gradual absorption of the anti-trades into the regular trade winds (27), on page 9, *ante*. But at the same time it must be stated, as is well known to all sailors, that these drifts are much influenced by the prevalent wind, and that, therefore, a contrary wind will weaken or stop the eastward tendency, as a strong westerly wind may increase its velocity.

8.—ICE.

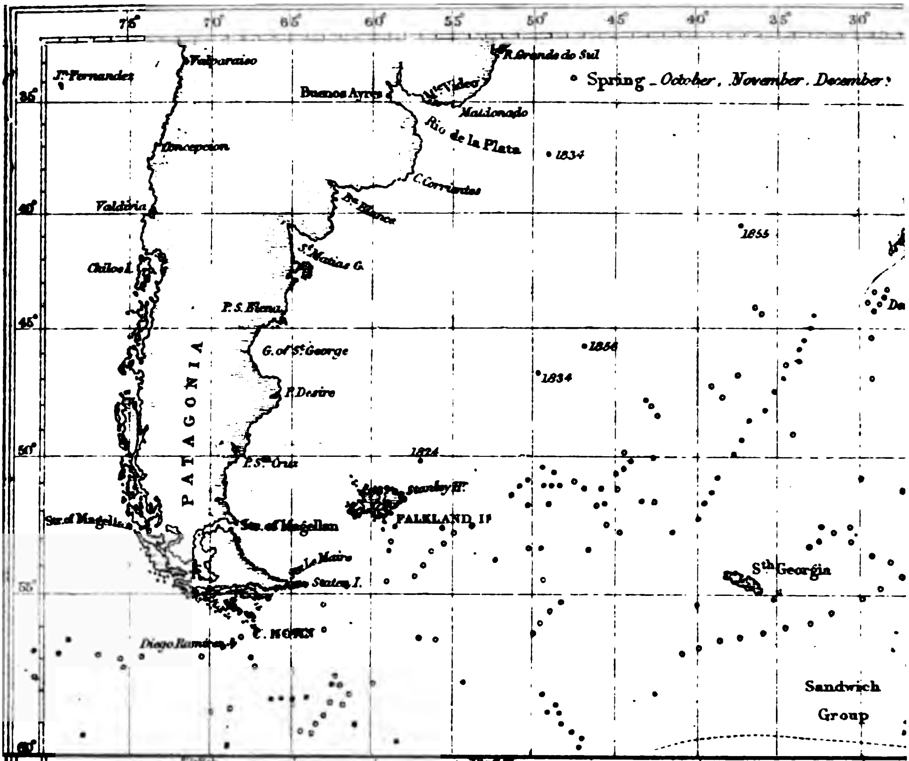
(208.) In high latitudes one great source of danger and apprehension is the existence of those floating masses which, uncertain in their locality, cannot be guarded against without a zealous look-out; and this is especially the case on the western side in passing around Cape Horn. The nature of the antarctic drift, which transports these vast impediments into the paths of commerce, has been just described. A few remarks will follow respecting the origin of the southern ice-bergs.

(209.) The whole of the southern icy barrier is formed of *land*-ice, and owes nothing to the sea of its enormous magnitude. The perfectly wall-faced cliffs forming their outer margin, are usually from 150 to 210 feet above the water level, indicating a thickness of over 1,000 feet, and these cliffs extend uninterrupedly for many hundred miles, being approachable in the summer to its foot. "The upper surface of these tabular barriers," says Sir James Ross," is like an immense plain of frosted silver; gigantic icicles depended from every projecting point of its perpendicular cliffs, proving that it sometimes thaws, which otherwise we could not have believed. In the North in August, the equivalent month to February, streams of water constantly pour from every iceberg.

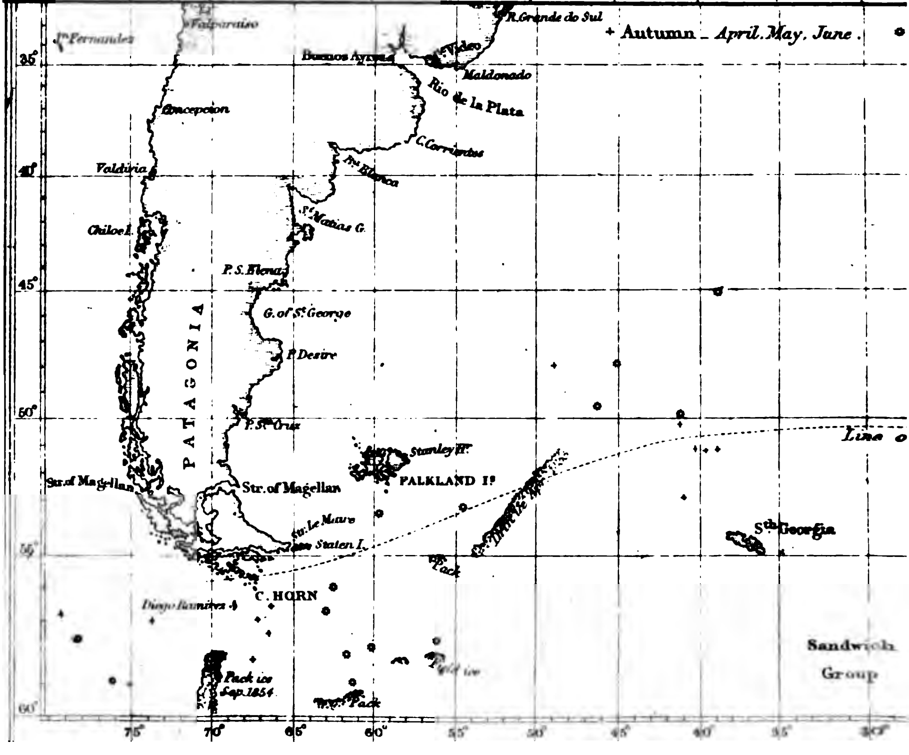
(210.) The regularity of their figure must be owing to its being undisturbed by ocean influence during its formation, and to its being free, or comparatively free, from those changes which alternate thawing and freezing would create. These fields of ice must then be formed by deposition on their upper surface only; and as rain is almost or quite unknown, the fogs and snows are the sources of their increase. These depositions being formed on the land, which at a very considerable distance from its outer edge rises into lofty mountains, which it is possible, or in some cases probable, consist of ice, and thus, from the weight of their upper strata, form continuous glaciers, and thrust forward those parts which have been formed on and beyond the foot of these mountains, which then being brought within the disruptive powers of the sea are detached, and form the floating bergs. The thickness and density of the antarctic ices will allow of the supposition that they are bodily thrust forward toward the sea, even if the inclination down which they move be very gradual, and that the interior portions of the land has by continual accretion obtained sufficient elevation, however vast it may be, to form a seaward slope of sufficient inclination.

(211.) The period required for the deposition of such a mass or ice is a very interesting question. These tabular bergs are all *stratified horizontally*, in some cases very completely so, by layers of dense and porous or snow-ice. These layers, according to Captain Wilkes, vary from six inches to four feet in thickness. Respecting the fall of snow, supposing it to be one inch per diem, it would take 30 years to form a mass of the usual thickness. Fogs are also a very efficient aid to their increase, for the same voyager states that his ship and rigging was covered with ice one-fourth of an inch thick in a few hours during a fog.

(212.) It is stated that there is no *pack-ice* on the antarctic coast. It would seem that all the vast quantities of floating ice are derived from the degradation of those well-faced cliffs. This is a very important distinction from the Arctic ices, when the "pack" formed on the surface of the sea during winter, forms by far the largest por-



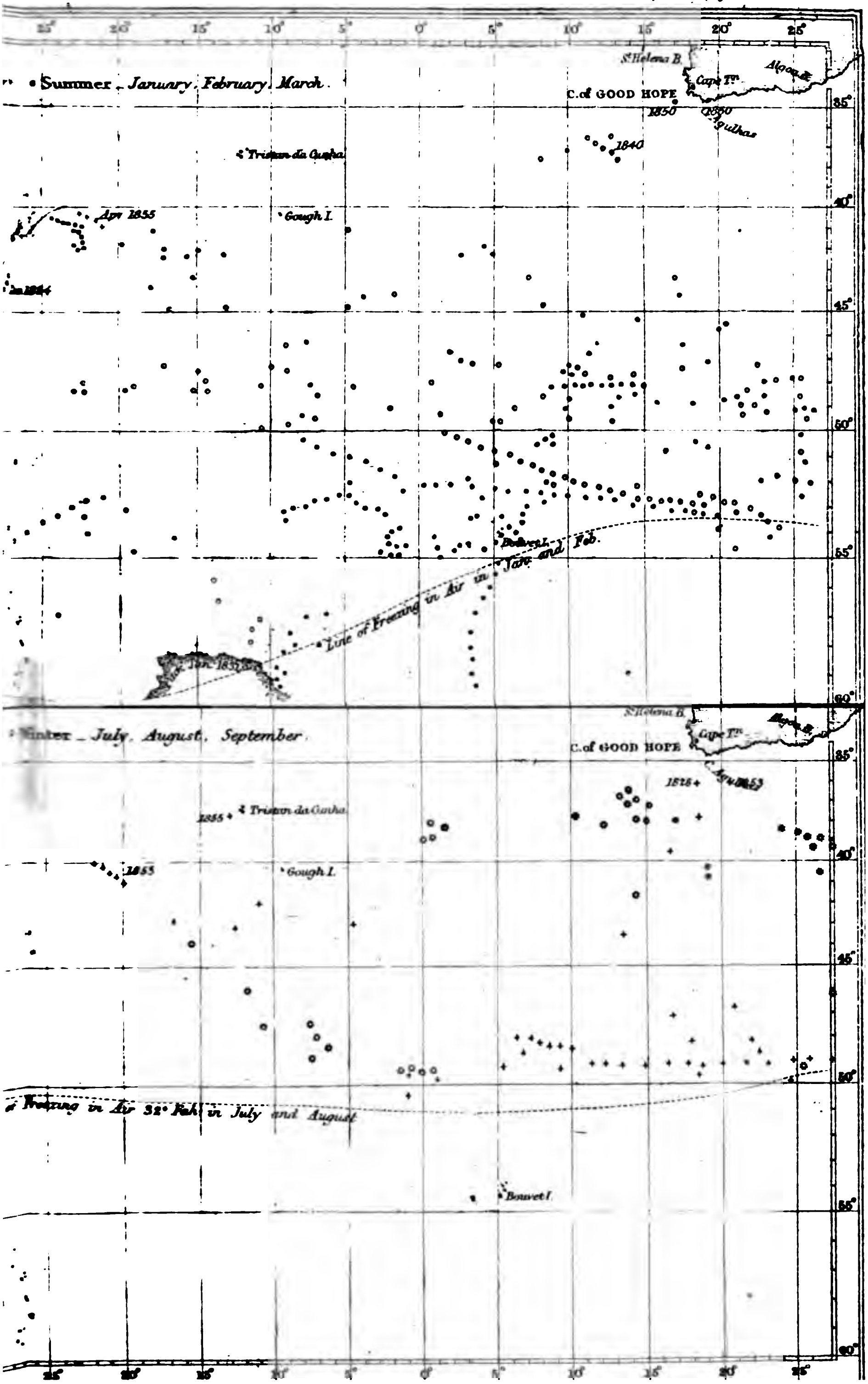
75° 70° 65° 60° 55° 50° 45° 40° 35° 30°
35° 40° 45° 50° 55° 60°
° Spring _ October, November, December.
Jn Fernandez
Valparaiso
Buenos Ayres
Mt Video
R. Grande do Sul
Maldonado
Rio de la Plata
C. Corrientes
Concepcion
Valdivia
Chiloe I.
Pta Blanca
St Matias G.
P. S. Elena
G. of St George
P. Desire
P. Sta Cruz
PATAGONIA
Str. of Magellan
Str. Le Maire
Staten I.
C. HORN
Diego Ramirez
Stanley Hr
FALKLAND Is
Sth Georgia
Sandwich Group
1834
1855
1856
1834
1824



+ Autumn _ April. May. June.
Jn Fernandez
Valparaiso
Buenos Ayres
Mt Video
R. Grande do Sul
Maldonado
Rio de la Plata
C. Corrientes
Concepcion
Valdivia
Chiloe I.
Pta Blanca
St Matias G.
P. S. Elena
G. of St George
P. Desire
P. Sta Cruz
PATAGONIA
Str. of Magellan
Str. Le Maire
Staten I.
C. HORN
Diego Ramirez
Stanley Hr
FALKLAND Is
Sth Georgia
Sandwich Group
Line o
Drift Ice
Pack
Field ice
Pack ice Sep. 1854
Pack
35° 40° 45° 50° 55° 60°
75° 70° 65° 60° 55° 50° 45° 40° 35° 30°

PREVALENCE OF ICE.

face page 108.



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In the North, when it is broken up, it is in pieces many miles in diameter; in South these masses are not a mile in circuit.

13.) These tabular bergs, rising 200 feet and upwards from the surface, are sub- ged 800 or 1,000 feet beneath the sea. Drifted by the northerly (sub-surface) they are brought into warmer water, which dissolves their deeply-seated bases, ch at first are generally covered with boulders and earth, and erodes them into y variety of fantastic form, and thus they ultimately lose their original line of tation, and roll over in every direction, till at last they disappear as field or pack-

214.) Their proximity is said to be invariably announced by a fall in the tempe- ure of the sea and air, and it is to this monition chiefly that the sailor must trust safety during the night or in foggy weather, which too often accompanies their sence. But it is not always that this indication is correct, for when the ice is to ward both of wind and current, it is manifest that this indication cannot be so ll depended on until in close proximity to the danger.

(215.) Mr. Towson, so well known for his useful labours in the service of naviga- n, drew up in 1859 the most perfect account of the southern ices, and from his per we extract the following results of his investigations, which later and more tensive inquiries have not impugned.

(216.) From the consideration of the facts collected, Mr. Towson draws the follow- g practical conclusions :—

First.—That the period comprising the months of November and December, 1854, id January, February. March, and April, 1855, was a most extraordinary season for ebergs. In every part of the southern hemisphere South of the fortieth parallel, e number of icebergs met with during these six months was beyond all recorded recedent. We had, during that period, a far greater number reported than the total f every other season from the time of Captain Cook down to the present year. hether such phenomena are periodical, or that of 1854—55 is an exceptional one, e cannot decide : but from the reports of those who have been engaged in the seal rade, we believe that for 50 years previously there had been no season bearing the ast comparison with the one under consideration. It has been observed that meteo- logical cycles exist in the southern hemisphere. If there exists a cycle in which ch seasons return, the period must be secular. One individual cannot therefore de- rmine this point.

Secondly.—That by far the greatest number of icebergs is met with in the Southern Hemisphere during the six months of November, December, January, February, March, and April. I have not the record of a single iceberg having been sighted in the midwinter months of June and July, and they have been seldom reported in the months of May and August. And further, that eastward of the Horn there is a space bordering on both the outward and homeward track, which may be regarded as dangerous from ice.

As far, however, as the homeward passage from Australia is affected by the consideration of this locality, it tends only to confirm our previous convictions, and we have more abundant reasons than ever to impress on the mariner the propriety of sighting the Horn and the Falkland Islands on his homeward passage. He has every inducement to follow this track. It is favourable for making a short passage, and it will keep the ship clear from the only locality, adjacent to the passage either out or home, in which real danger exists on account of the ice. I think great sacrifices should be made to follow this part of the route home rigidly, for I have not met with any very extraordinary voyage home made by a ship that has given to the Horn or the Falkland Islands a wide berth. In all cases in which no danger has been experienced from ice, delays have been occasioned, and the passage has been spoiled, nor have I a case on record in which any mariner, following this advice, has met with ice after arriving East of the meridian of 75° W.

(217.) Mr. Towson's valuable labours were afterwards supplemented by a further accession of examples, which were inserted in the "Mercantile Marine Magazine" of 1859. The list was much extended by the addition of all the notices which were received by the Meteorological Department of the Board of Trade, up to the period of the death of its lamented founder, Admiral FitzRoy. From the report issued on this subject, the following table of ice drifts recorded in that office, as having been encountered in the South-Atlantic, is selected. It is arranged according to the seasons of the year, commencing with June, the mid-winter month. It is also illustrated by the Chart of the Currents, which shows the locality of them.

CATALOGUE OF ICE.

Year.	Latitude.		Longitude.		Description.
					June.
	°	'	°	'	
1856	47	28 S.	37	25 W.	A large iceberg.
					July.
1856	49	42	46	6	A large iceberg, with many small pieces on the on the South side of it.
					August.
1840	36	10	13	40 E.	Two icebergs.
—	36	38	13	15	Two ice islands.
—	37	32	14	10	An iceberg about 1,000 feet high.
—	38	9	0	01	Many icebergs and fields.
—	38	30	1	0	Four icebergs.
—	40	25	19	0	An iceberg 300 feet high and 400 feet long.
—	41	30	14	10	An iceberg 400 feet high and 1,000 feet long.
1854	50	0	41	0 W.	Several icebergs.
—	53	0	47	0	Icebergs.
—	55	0	51	0	Pack ice.
—	56	30	60	0	Pack ice.
					September.
1844	37	8	24	0 E.	Four icebergs, 100 to 200 feet high.
1840	37	0	13	0	An iceberg.
—	37	0	15	0	An iceberg.
—	37	0	15	0	An iceberg 400 feet high and 1,000 feet long, probably the same as last named.
—	37	30	10	0	An iceberg.
—	37	45	14	50	An iceberg.
1844	38	10	24	0	Many large icebergs, on a surface of 180 miles, S.E. and N.W.
—	39	4	25	50	Many icebergs.
1840	40	20	26	0	One iceberg, 100 feet high, and four smaller ones.
—	40	30	19	0	Two icebergs.
—	41	30	14	10	An iceberg, a mile in circumference.
1854	44	40	15	20 W.	Icebergs.
—	46	0	12	0	A large iceberg.
—	47	30	10	35	Two small icebergs.
—	47	30	10	40	Icebergs.
—	49	34	1	39	Three icebergs.
—	49	40	1 —0	40 W. 20 E.	Numerous icebergs.
1860	53	40	39	43 W.	An iceberg.
—	56	50	63	0	A very large iceberg 200 feet high and nearly three miles long.

Year.	Latitude.	Longitude.	Description.
			SEPTEMBER—*continued.*
	° ′	° ′	
1854	58 0 S.	56 0 W.	An ice-field.
1857	59 0	61 20	Pack ice.
1854	63° to 58°	69° to 72°	Pack ice.
			OCTOBER.
1840	36 57	13 47 E.	Two large icebergs.
—	38° to 37°	12° to 14°	Five icebergs.
1858	44 50	9 34	A small iceberg.
1856	45 10	28 24 W.	Two icebergs.
—	46 10	33 21	Three icebergs.
—	46 33	36 3	One iceberg.
1858	47 26	10 34 E.	An iceberg 300 feet high, 600 to 700 feet long.
1855	47 47	22 0 W.	" Supposed ice."
—	47 51	21 0	Many icebergs.
—	48 0	18 37	Two large icebergs.
—	48 0	21 0	A very large iceberg.
1853	53 0	19 0 E.	An iceberg.
1860	53 0	49 0 W.	A large iceberg, and some small pieces.
1853	53 12	21 23 E.	Three icebergs and field ice.
1860	54 57	65 10 W.	" Passed two large icebergs in the straits."
—	56 0	62 0	Two large icebergs 50 miles apart, E.N.E. and W.S.W. (true).
—	57 0	66 16	A large iceberg.
1845	57 45	61 5	An iceberg.
1860	59 6	71 16	A large iceberg, and a quantity of pieces.
1859	59 50	68 0	Three large icebergs.
			NOVEMBER.
1856	37 43	13 30	A piece of ice, much kelp.
1853	40 45	4 0	An iceberg.
1854	43 38	8 15 E.	Four large icebergs.
1858	44 11	0 45 W.	An iceberg.
1854	44 24	22 0	Three icebergs. Water 52°.
1853	44 41	3 51	" Supposed ice in neighbourhood."
1855	44 39	15 28	Seven icebergs.
—	44 52	12 0	Three icebergs, one very large.
1856	46 22	8 0	A large iceberg.
1855	47 10	16 11	Numerous icebergs.
1856	47 10	9 0	Several small icebergs.
—	47 28	8 0	A large iceberg, with small ice to leeward of it.
1853	47 40	10 0	An iceberg.
1855	47 50	2 0 E.	A very large iceberg.
1854	48 0	18 0 W.	A very large iceberg.
1855	48 4	14 20	Six icebergs. Temperature of air 36°, water 37°.
—	48 7	3 27	Several very large icebergs.
1856	48 8	5 58	One very large iceberg and several smaller ones.
1859	48 50	33 0	A small iceberg.
1856	48 55	1 0	Two icebergs.
—	49 19	7 30 E.	Two icebergs.
—	49 30	10 45	Six small icebergs.
1855	49 35	9 57 W.	A large iceberg. Temperature of air 35°, water 38°; both at about 200 yards distance.
—	49 50	7 57	A large iceberg.
—	49 45	13 42 E.	Four small icebergs.
1856	50 50	15 0	" Plenty of ice about."
1862	50 50	45 0 W.	An iceberg about 200 feet high, which much resembled an island till within about a mile of it; the deception was caused by a vapour which ascended from its base.

YEAR.	LATITUDE.	LONGITUDE.	DESCRIPTION.
			NOVEMBER—*continued.*
	° ′	° ′	
1853	52 26 S.	19 42 E.	A large iceberg.
1860	52 30	52 50 W.	Two large icebergs.
—	52 50	54 25	A large iceberg 100 feet high, and nearly circular.
1860	53 6	54 36	Two icebergs, about 5 miles in length, 3 in breadth, and about 200 feet high.
—	54 36	57 46	A large iceberg about 4 miles long, 3½ miles broad, and 200 feet high.
—	54 53	60 16	A large iceberg 2 miles long and 150 feet high, in the form of a wedge sloping to the S.W.: also some large pieces of ice about the size of the ship.
1854	56 30	56 0	Icebergs.
1859	56 30	55 0	A large iceberg.
1860	57 40	64 40	A large iceberg.
1854	58 0	59 0	Icebergs.
—	61° to 58°	65° to 61°	Numerous icebergs.
			DECEMBER.
1855	43 33	18 10 E.	Two large icebergs.
1854	44° to 43°	28 0 W.	An immense connected mass of icebergs.
1855	47 10	4 38 E.	One small iceberg.
—	47 22	6 6	Two icebergs; one large.
1854	47 33	18 10	Two icebergs.
1855	47 40	9 55	One small iceberg.
—	47 43	10 59	A large iceberg. Air 43°, water 44°.
—	47 50	11 26	Seventeen icebergs passed during the day. They appeared to be in lines running N.W. and S.E. Temperature of air (noon) 55°, water 45°.
—	48 0	13 21	An iceberg, and several small pieces.
—	48 2	15 39	Twelve icebergs; some very large.
—	48 51	9 26	About eighty icebergs, and much drift ice.
—	49 20	2 30	Several icebergs.
—	49 30	6 0 W.	Several very large icebergs.
1856	49 34	43 14	Ten icebergs; some very large.
1855	49 36	1 55	Two icebergs, about two miles long.
—	49 43	6 18 E.	Many icebergs of various sizes.
1854	50 0	2 30	Two icebergs; one 100 feet in height. Temperature of water 34°.
—	50 30	19 30	Icebergs.
1772	50 40	20 0	An ice island, 50 feet high, and half a mile in cir-circumference.
1854	50° to 53°	3° to 22°	Numerous icebergs.
—	51 17	6 0	Four large icebergs. Water 36°.
—	52 0	9 52	Nine icebergs. Water 32°.
—	52 0	15 25	Four icebergs. Water 30°.
—	52 12	15 24	Eight icebergs.
1856	52 12	44 31 W.	An iceberg, drifting apparently to the N.E.
1854	52 29	15 23 E.	Four icebergs. Water 31°.
1856	52 30	43 40 W.	Nine icebergs, in a line E. and W.
1857	53 15	57 41 W.	An iceberg. Air 41°, water 43°.
1772	54 0	20 52 E.	Icebergs and icefields.
1856	54 12	48 0 W.	One large iceberg.
1830	55 30	13 0	Icebergs.
1854	55° to 56°	49° to 47°	Numerous icebergs.
1830	56 30	13 0	Icebergs.
—	57 0	23 0	Icebergs.
1857	57 12	66 12	An iceberg to the southward.
1830	58° to 57°	9° to 10°	Numerous icebergs.

Year.	Latitude.	Longitude.	Description.
			January.
1850	34 0 S.	20 20 E.	An iceberg seen from the Cape.
1850	34 50	18 30	A piece of ice, very flat, 30 feet long, 100 feet thick, in sight of Cape of Good Hope.
1855	40 0	36 0 W.	Numerous icebergs.
—	41 0	17 0	An iceberg.
—	42 0	14 0	Icebergs.
—	42 0	16 0	An iceberg.
—	42 0	22 0	Connected icebergs.
—	42 18	12 8	Thirty-four icebergs, all sizes.
—	43 40	16 52	Twenty-six icebergs, all sizes.
1856	44 25	18 14 E.	A large iceberg, surrounded by large pieces.
1855	44 20	2 47 W.	Fragments of an iceberg.
1859	45 8	11 54 E.	An iceberg, bearing E.N.E. about 20′. Temperature of air and water 46°.
1856	45 30	45 30 W.	Several icebergs.
1855	45 33	15 33 E.	Three icebergs, 100 feet long, 150 high.
—	45 40	21 0	Icebergs.
1856	46 15	6 43 W.	Three large icebergs.
—	47 15	14 0	Icebergs.
—	48 15	10° to 15° E.	Thirteen large icebergs.
—	48 30	15 27	A large iceberg.
—	49 0	17 0	Three icebergs.
—	49 4	19 20	A large iceberg.
—	49 10	14 0	Icebergs.
1857	50 52	17 39	A large iceberg, drifting to northward. Temperature of air 47°, water 37°.
1858	51 24	44 53 W.	Icebergs.
—	51 30	49 49	Numerous icebergs.
—	53 0	48 0	Numerous icebergs.
—	53 30	51 0	Numerous icebergs, one three miles long.
			February.
1855	41 30	18 30 E.	Icebergs.
—	41 30	21 40	Connected icebergs.
1856	46 59	12 15 E.	An iceberg.
1855	47 13	20 0	Several icebergs.
1858	50 14	44 0 W.	A few pieces of small ice.
—	50 45	46 58	Several icebergs.
—	50 45	49 47	Two icebergs.
—	50 54	47 45	Several icebergs. Temperature of air 52°, water 44°.
—	50 54	45 22	Twenty icebergs, some 300 feet high, and three miles long. Air 46°, water 44°.
—	51 0	47 0	Numerous icebergs.
1855	—	—	Numerous icebergs.
1858	51 28	49 7	Several icebergs.
1774	52 30	4 0	Three icebergs.
—	53 30	6 35 E.	Three icebergs.
—	53 30	8 0 W.	Two icebergs,
—	53 54	0 30	Three icebergs.
—	53 54	6 35 E.	Many ice islands.
—	54 0	21 0 W.	Several icebergs.
—	54 20	15 30	Three icebergs.
1775	57 20	4 0 E.	An iceberg.
1860	57 50	53 8 W.	Numerous large icebergs.
1775	58 0	6 3	Three icebergs.
1860	58 0	56 16	Two icebergs.

Year.	Latitude.	Longitude.	Description.
			March.
	° ′	° ′	
1855	49 40 S.	{ 21 30 to 23 30 W. }	Connected icebergs.
—	42 20	14 40	Icebergs.
—	42 35	16 0	Icebergs in great quantities.
—	42 46	16 1	Icebergs in great quantities.
—	43 19	14 17	A piece of ice.
1856	46 50	3 11 E.	Icebergs.
1855	44° to 52°	32° to 39° W.	Thirty-nine Icebergs.
1774	48 30	14 26 E.	Two large ice islands.
1858	49 45	41 30 W.	Four icebergs.
1855	40 37	6 54	A piece of ice and two bergs.
1858	50 0	48 0	One iceberg.
—	50 10	47 21	Seventeen large icebergs.
—	51 0	50 0	Icebergs.
1855	50° to 52°	7° to 0°	Numerous icebergs.
1858	51 30	42 34	Two icebergs.
1855	52 18	0 27	Many ice islands.
—	52 39	5 4 E.	Many ice islands.
—	52 30	40 30 W.	Numerous icebergs.
—	52° to 53°	0° to 23° E.	Numerous icebergs.
—	53 14	20 44	Nearly beset in the ice.
—	53 14	14 41	Many ice islands, and an iceberg 960 feet high. Water 34°.
1774	53 17	11 53	Many ice islands.
1855	62° to 58°	60° to 68° W.	Numerous icebergs.
			April.
1828	35 50	18 5 E.	Many icebergs, some 100 feet high.
1853	36 0	20 0	Numerous icebergs.
1828	37 30	18 7	Five icebergs, about 250 feet high.
1855	40° to 41°	20° to 22° W.	Connected icebergs.
—	43 0	5 0	Numerous icebergs.
1856	43 0	16 45	Two icebergs. Air 47°. water 40°.
1855	43 8	12 42	Numerous large icebergs.
—	43 30	13 0 E.	Numerous icebergs.
—	47 15	16 33	Thirty icebergs.
1855	47 46	7 47 W.	Three large icebergs.
1856	48 9	7 38	Seven icebergs. Air 46°, water 36.
1855	48 20	48 40	Several icebergs.
1856	48 35	11 0 E.	Fortyicebergs.
1855	48 43	11 45	A large iceberg 400 feet high, and much broken ice.
—	48° to 49°	6° to 12°	Numerous icebergs.
—	48 44	6 43	"An ice island, 300 feet high, and may ice fields; and in the evening passed numerous icebergs and pieces."
—	48 46	7 47 W.	Three large icebergs.
1856	49 32	8 30 E.	Field ice and icebergs.
—	49 59	0 30	"Steering N.N.W., parallel with a line of forty-seven icebergs.
—	50 18	1 7 W.	A long line of icebergs, N.N.E. and S.S.W. Air 44°, water 32°.
1855	51 0	40° to 39°	Numerous icebergs.
—	51° to 55°	44° to 50°	Drift ice (debris of icebergs ?).
—	50 0	41 0	Icebergs.
—	53 0	41 0	Numerous icebergs.

YEAR.	LATITUDE.	LONGITUDE.	DESCRIPTION.
			MAY.
	° ′	° ′	
1839	39 30 S.	16 11 E.	An iceberg 250 feet high.
—	48 0	18 0	Several icebergs, one covered with snow and broken ice.
—	49 0	11° to 31°	Numerous icebergs.
1856	58 35	67 38	A small iceberg.

REMARKS.

(218.) The foregoing list will be amply sufficient to demonstrate the locality and frequency of the ice-drifts. It sufficiently explains itself in these particulars, but the following remarks, appended to the Tables in the Report of the Meteorological Department, and in Mr. Towson's paper will be interesting.

(219.) A glance at the charts will show where ice has been met with in any month' and a reference to the catalogue will show the year in which that ice was seen' as well as the description of ice, when known, whether bergs or drift ice. &c.

A reference should always be made to the catalogue, for the charts alone would be apt to mislead. For instance, the chart for September shows a great deal of ice near the Cape of Good Hope, but, by referring to the catalogue, it appears that this circumstance was quite exceptional, for all this ice was seen in the years 1840 and 1844, and since 1844 no ice has been met with near the Cape in September.

It will be observed that few reports of ice are recorded, save near the usual tracks of ships. It would be wrong to infer from this, that the regions South of the usual route are comparatively free from ice; the fact being that we have not sufficient information on the subject to speak positively, although in certain seasons more icebergs seem to be met with in the lower latitudes than in the higher, in the Pacific. A remarkable instance of this, mentioned by Mr. Towson, occurred in November, 1854, when the *Great Britain* passed 280 icebergs in 56° S. latitude, between 112° and 92° W., while the *Golden Era*, passing the same meridians at the unusually high latitude of 63° S., never met an iceberg, nor, until reaching 72° W., when she was surrounded by pack ice, and narrowly escaped being wrecked, did she experience any inconvenience from ice.

One thing is quite evident that there is far greater danger from ice during the summer months, in the southern hemisphere, than during the winter. Of about 550 reports of ice sighted, nearly half occurred in November, December, and January, while there are only five reports of ice having been seen in June, and only three in July. One fifth of the reports relates to ice sighted in December, and the ice seen in June and July together is to that met with in December alone, rather less than 1 to 13.

The decrease from January to April is less rapid than the increase from August to November, and the probability of falling in with ice in the autumn months of March and April is as 5 to 3 nearly, compared with the chance of sighting it during the spring months of September and October, although more ice has been seen in December than in any other one month.

(220.) Many of the icebergs which have been reported were of immense size. The Dutch ship *General Baron Von Geen*, on the 16th of August, 1840, passed one about 1,000 feet high, in 37° 32′ S., 14° 10′ E.; another, 960 feet in height, was sighted by the *Agneta*, in latitude 53° 14′ S., longitude 14° 41′ E., on the 23rd of March, 1855, An iceberg, as large as Tristan d'Acunha, in latitude 53° 40′ S., longitude 123° 17′ W., on the 15th of May, 1859, is reported by the *Bosworth*; and the *Queen of Nations* fell in with one as high as 720 feet in 53° 45′ S., 170° 0′ W., on the 25th of December, 1861.

Several icebergs three miles long, and about 300 feet high, were passed on February the 12th, 1858, in latitude 50° 54′ S., 45° 22′ W. langitude, by the *Light of the Age*, and another of about the same dimensions by the *Silistria*, not far from Cape Horn, in latitude 56° 50′ S., 63° 0′ W. longitude, on the 29th of September, 1860.

The extraordinary mass of ice which, though not exceeding 300 feet in height, was reported to be 60 miles by 40 miles long, and which was seen by many ships during the five months of December, 1854, and January, February, March, and April, 1855, is fully described in Mr. Towson's pamphlet quoted below. This mass of ice is supposed to have consisted of numerous connected icebergs. During the time mentioned it floated from about 44° S. 28° W. to about 40° S. and 20° W. Its approximate position in each of the months named has been distinguished on the charts by the letter A. No report of this ice having been seen since April, 1855, has been received, so that it probably broke up and dispersed shortly after that time, or else turned southward, and drifted out of the usual track of ships.

A very large iceberg, about 580 feet in height, and nearly three miles long, was seen by Captain Smithers, of the *Edmond*, in latitude 50° 52′ S., longitude 43° 58′ W., on the 1st of December, 1859. So strongly did this iceberg resemble land that Captain Smithers believed it to be an island, and reported it as such; but there is little or no doubt that it was in reality an iceberg. There were pieces of drift ice under its lee.

It was near the same place, in 50° 50′ S., 45° 0′ W., that another iceberg was passed by the *Gleaner*, only a fortnight earlier, about 200 feet high, and resembling an island very strongly until the ship was within about a mile of it, the deception being aided by a vapour which ascended from the base of the iceberg, and hung about one side of it.

Several very large icebergs, said to have been four and five miles long, and three miles in breadth, were sighted by the *Zillah*, on the 15th and 16th of Nnvember, 1860, in latitude 54° to 53° S., longitude 57° to 54° W.

In December, 1861, the *Queen of Nations* passed an iceberg apparently very old, and having the appearance of earth sticking to it, in 57° S., 146° W. This berg may possibly have grounded, and subsequently floated again, and turned over.

The temperature of the water does not seem to be an infallible guide as to the vicinity of ice, although generally on approaching ice there is a marked diminution in the temperature of air and water, but especially the latter.

Captain Clark, of the *Lightning*, in February, 1860, when in latitude 55° 20′ S., longitude 125° 45′ W., found the surface temperature as high as 45°, although there was ice at a distance of only two miles and on both sides of the ship (one berg being 500 feet high, and three miles long), while a few days later, in latitude 56° 0′ S., longitude 90° 54′ W., there was a sudden (but only temporary) fall of the surface temperature to 38°, though there was no ice, or any appearance of it.

(221.) Mr. Towson says: But most of the reported masses of ice appear insignificant when compared with a body of ice reported to have been passed by twenty-one ships during the five months of December, 1854, and January February, March, and April, 1855, floating from lat. 44° S., long. 28° W., to lat. 40° S., long. 20° W.

This mass has received the various denominations of an immense iceberg, an ice-island, "groote ijs eiland," and a connected mass of icebergs. Its elevation in no case exceeded 300 feet; but its horizontal dimensions were sixty miles by forty. It was of the form of a hook, the longer shank of which was sixty miles, the shorter forty miles, and embayed between these mountains of ice was a space of water forty miles across. The first account of it was received from the *Great Britain*, which, in December, 1854, was reported to have steamed fifty miles along the outer side of the longer shank. This longest range of ice then bore N.E. and S.W., the bay before alluded to being open to the N.E. Whilst in this position it exposed ships to but little danger, since the bay could only be entered on the opposite course to that of ships on their homeward passage from Australia. But during the next three months it swung round 90° to the left, and drifted E.N.E. about 100 miles, which brought it very near to the route of outward bound ships, with the bay open to their track. We can scarcely imagine any mass of ice in an equally dangerous form, and I regret to add that one emigrant ship, the *Guiding Star*, was embayed and lost on it with all hands. The *Cambridge* and *Salem* were also embayed in March and April, 1855, but through the skill of their commanders they were extricated from the most perilous situation in which we can conceive a ship to be placed by ice in any form. Beyond doubt this was an extraordinary phenomenon, there being no record of any other mass of ice bearing even approximate horizontal proportions to those now described.

(222.) Mr. Towson says: In tracing some remarkable masses of ice, I have been able to determine the direction of their drift, and their rate of progress. With the exception of one locality, the course of an iceberg is E. by N., rate 10 miles per diem. The only exception is, after it has passed to the eastward of the Horn, when its course bends to the N.E., veering round to the East as it approaches the lat. of 40° S., on which parallel from the meridian of 25° W. to 15° W., its progress is scarcely one mile daily, in direction nearly East. This course is afterwards bent towards the South, crossing the meridian of Greenwich on the S.E. rhumb. I have been unable to determine whether it again changes its course to E. by N. or returns by a vortical current to the neighbourhood of the Horn. There are facts tending to support both of these hypotheses; but since near the meridian of Greenwich few ships go higher than lat. 50° S., we have not a sufficient number of observations to enable me to decide this question.

THE ROLLERS OF ASCENSION, FERNANDO NORONHA, ST. HELENA, ETC.

A very important subject in connection with landing or embarking on an unprotected coast, such as those of almost all parts of the South Atlantic, and especially on the islands which lie in it, is the occurrence of that heavy swell which sets on without any previous indications, and renders the use of boats impossible,

Such phenomena are not rare in many parts of the world, and are even experienced on the coasts of Great Britain, but are of very great magnitude on the beaches of the islands in question. Their origin has been the subject of much discussion, and of very varied opinions, for nothing very definite has been obtained respecting them. It was in the former editions of this work that the editor first promulgated the view that *they were caused by distant cyclones*; and this, it will be seen, is now to be considered as the most probable source of these singular visitations. The following notes are taken from our previous work.

In the narrative of Mr. Webster, this gentleman says, "One of the most interesting phenomena that the island affords is that of the rollers; in other words, a heavy swell producing a high surf on the leeward shores of the island, occurring without any apparent cause. All is tranquil in the distance, the sea breeze scarcely ripples the surface of the wave, when a high swelling wave is suddenly observed rolling toward the island. At first it appears to move slowly forward, till at length it breaks on the outer reefs. The swell then increases, wave urges on wave, until it reaches the beach, where it bursts with tremendous fury. The Rollers now set in and augment in violence, until they attain a terrific and awful grandeur, affording a magnificent sight to the spectator, and one which I have witnessed with mingled emotion of terror and delight. A towering sea rolls forward on the island, like a vast ridge of waters, threatening, as it were, to envelop it; pile on pile succeeds with resistless force, until, meeting with the rushing offset from the shore beneath, they rise like a wall, and are dashed with impetuous fury on the long line of the coast, producing a stunning noise. The beach is now mantled over with foam, the mighty waters sweep over the plain, and the very houses at the town are shaken by the fury of the waves. But the principal beauty of the scene consists in the continuous ridge of water crested on its summit with foam and spray; for, as the wind blows off the shore, the over-arching top of the wave meets resistance, and is carried, as it were, back against the curl of the swell; and thus it plays elegantly above it, as it rolls furiously onward, graceful as a bending plume; while, to add more to its beauty, the sunbeams are reflected from it it in all the varied tints of the rainbow.

"Amid the tranquillity which prevails around, it is a matter of speculation to account for this commotion of the waters, as great as if the most awful tempest, or the wildest hurricane, had swept the bosom of the deep. It occurs in situations where no such swell would be expected, in sheltered bays, and where the wind never reaches the shore. The strong and well-built jetty of the town has once been washed away by the rollers, which sometimes make a complete breach over it, although it is 20 feet above high water mark. On these occasions the crane at its extremity is washed round in various directions, as the weathercock is turned by the wind, and landing becomes impracticable for the space of two or three days. Such are the Rollers of Ascension, and like unto them are those of St. Helena and Fernando Noronha.

"The season in which the rollers prevail is from December to April, not but that they do occur at other periods, and they have been felt severely in July. Ships at the anchorage are perfectly secure, and they have to apprehend no danger unless within the immediate influence of the breakers. Not only are the seasons of the Rollers the same at St. Helena and Ascension, but they sometimes are simultaneous in occurrence. The *Chanticleer*, while at anchor at St. Helena, on the 17th and 18th of January, 1830, experienced some very high rollers, inasmuch that Captain Foster and his gig's crew landed with the utmost difficulty. On our subsequent arrival at Ascension, I inspected the "Meteorological Journal" of my friend Mitchell, the surgeon of the island, and found it noted that the Rollers were so violent on the 15th, 16th, and 17th of January, that landing was impossible. Here, then, is a coincidence as to time.

"The cause of the Rollers has been speculated on, and various conjectures have been formed of them. Some have attributed them to the effects of the moon:

> 'Whom Ocean feels through all his countless waves,
> And owns her power on every shore he laves.'

And others have attributed them to the tides; but it is evident that these have nothing to do with them. They occur in the most tranquil season of the year, when the S.E. trade wind is often very light, where the vast volume of water is constantly impelled in one direction. There is then a tendency to a back set, or a rush of water in a contrary direction, and a tumultuous swell is produced wherever it meets with the resistance from the islands and the banks on which they are based, as well as the shores of a continent. The long steep beaches of Ascension are admirably adapted for the full display of the effect which has been just described,"

Commander Fishbourne, R.N., gives the following from his ezperience at Ascension, &c., which will be interesting in addition to the preceding.

"The rollers are said to be very capricious in their rise and progress; but this assertion, I think, will fall before continued observation; and my experience of eight months tends to show that they render to reason a sign of their coming, if not a solution of their cause. A distant ripple, extending itself to N.W. from the extremes of land, was visible from any part of the bay or island, appearing to arise from the water outside of the island being higher than that within the bay.

"This ripple was apparent from the middle of February to August, and of greatest amount in May and June, and seems to be the result of a N.N.-westerly current, which runs during these months. This current divides at the southern extremity of each bay, preventing a direct inflow. Thence the direction of the roller must depend upon the position of the bay with respect to the current.

"They commence, however, generally from a quarter as far to southward as the southern extreme of each bay will admit of; from which direction, subsiding as they alter their progress, or sweep round the point of the bay, they disappear about five points North of the first direction. They commence in February, and become more frequent and heavy in May and June, after which they are less in size and frequency, and cease in September. I have been told that rollers come in from the North in December. This, however, is rare; but they are then quite as high, if not higher, than at any other period. While I believe the direction to be correctly stated, I think the height exaggerated, it being estimated from the effect on the pier, which effect must always be greater, all other things equal, than from any other direction, on account of the more direct action, the pier being open most to waves from North to N.E., the foul ground breaking their force when from the westward.

"The rollers were generally preceded by light and variable winds, and followed by an increase of trade wind (considerable when the rollers were highest) and an extremely attenuated atmosphere, so transparent that the Green Mountain certainly appeared but half its distance from the anchorage, and this without any increase of moisture. Once there was considerable moisture; the mountain then appeared still nearer, and the rollers were accompanied if not preceded by rain. Attention to these indications enabled me to predict the coming rollers; and though I inferred corresponding barometric changes, I was not surprised at the apparently insufficient differences, on account of the many circumstances attending to vitiate the apparent unconnected, if not corrected, results. For instance, the mountain being on the weather side of the island, and the bay on the lee, the clouds, condensed by the mountain, pass over in dense masses, assuming a singular constant triangular shape, during the afore-mentioned months, the apex of the triangle being in the N.W. Though the tide may be in some measure corrected; for when regular, its height is too irregularly modified by the rollers to admit of a correction. The concentrated heat in the bay, modified by the direction and force of the wind, producing a greater or less increase of elasticity, all tend to vitiate barometric results.

"The following may go far to elucidate the causes of the above-mentioned effects. Lieutenant Bold, in his 'African Guide,' says, that 'the currents have northing or southing in proportion as the trades incline towards the tropics, and their velocity is increased by an increase of the trade wind.' Now, such must be the case at this place during the months of May, June, and July, when the S.E. trade is extending its northern limit further to the northward, and will account for the strong ripple mentioned before, and also for the strong N.N.W. current, which we found in July to be running full 36 miles in 24 hours, in smooth weather, and must have been quite 35 miles during the storm breeze which we experienced in June. Again: the height of the barometer in this latitude being less than it is to the southward, this last increased perhaps by there being more southing in the wind in May and June, together with the fact that the rarefaction of the air in the tropics (and being greatest here about May and June) producing an ascending, consequently relieving pressure current, and to the greatest amount during these months, will tend to induce a wave in this direction from the point of greatest pressure, which must be from the South, while the sun is so far North of this latitude; and from the high barometric states, together with the descent of the superior return current in the southern latitudes, we may infer a wave will be propagated in the direction of the point of least pressure, which will be generally to the northward in this hemisphere; but I presume must be so during the months of May and June.

"If this implied want of hydrostatic equilibrium be correct, it ought to be greatest or at least produce greatest effects on the winds, currents, and rollers, in the months of May and June. I find, on reference to the log, that the winds were of greatest force during the last days of April; but still strong through May and June. The

Edward, of Shields, arrived here, having experienced strong winds in May; and H.M. ships *Fawn*, *Prompt*, and *Rolla*, arrived here early in June, having had to contend with strong southerly winds, with a northerly current; and referring to the remarks in the meteorological table, I find that the rollers rose heavy and most continuous in May and June.

"To account for the change of direction in the rollers, as they pass to their subsidence, I can well imagine that, as the equilibrium is in process of restoration, the currents of the air and water will decrease in velocity; the wave also will decrease and alter its direction, till even re-action may produce almost an opposite direction; in which cases it must roll into bays open to the N.W. The anchorage here, and at St. Helena, being on the N.W. side of the islands, may account for the rollers being said to come from the N.W.; and it is probable that they are highest at the anchorages, from their being to leeward. The period when the rollers are said to come in from the northward being in December, at which time sun is in high South declination, it is not improbable, I think, that the pressure may be greater to the northward than here, and hence propagate a wave in this direction. There is a singular, and, as I am told, regular process observable here; and it appears consequent upon the rollers or their causes, which is a beautiful illustration of a nice adaptation of a universal law to the individual latitudes, and another of the many proofs of design with which earth, air, and ocean are strewed, bespeaking a Creator, lavish in greatness, supplying all our real wants, and bounteous in goodness and truth.

"The selvage of land round the bays where the turtle lay their eggs is increased considerably in breadth during the season of incubation. In this process of extension, it becomes shelving and easy of access; after which it appears to narrow to its original dimensions, and becomes precipitous; thus affording additional space and facility of gaining it."

In the "Colombian Navigator," Vol. III. p. 26, et seq., is given an extract from a paper by the late talented Sir Robert Schomburgck, in which the reader will find descriptions of these phenomena on the north-eastern face of the West India Islands.

These remarkable waves, which are felt on most of the shores of the ocean, have, it is probable, different causes which produce them; but their most frequent origin, it may be assumed, is in the hurricanes and storms of the equatorial regions.

A few extracts will illustrate our point, that they are caused by the cyclones and gales of distant regions.

Captain Midgley says, "On my outward passage from Liverpool to Africa, in the ship *John Campbell*, on the 29th December, 1840, in lat. 33° 3′ N., long. 19° 24′ W., about 3^h p.m., I found the vessel suddenly entering into very heavy rollers, setting from the N.W. quarter. The wind was moderate from S.E. by E., the ship steering the S.W. *Much sheet lightning had been previously seen in the N.W. quarter*, and a few showers of rain had fallen. These Rollers were in too regular ridges to be mistaken for the sea which marks the commencement or termination of a gale of wind, although they sometimes topped into breakers. The ship was going 5 knots through the water, and came suddenly amongst them, when the Rollers increased very rapidly, and as rapidly terminated. The ship continued in these for about 4 hours, and sailed 21 miles through them. The weather fine and clear, and the barometer perfectly steady throughout the day (at least from the preceding noon), at 30·20, attached thermometer, 64° Fahrenheit at 8 p.m., moderate breezes from S.E. by E., with generally fine clear weather, and much sheet lightning in the N.W. quarter."

Captain FitzRoy says, "Returning homeward by St. Helena, Ascension, and the Cape de Verde Islands, I had opportunities of proving that the Rollers which sometimes set heavily on their shores are caused by distant gales of wind. Those at Ascension and St. Helena, for instance, by pamperos, and those at the Cape de Verdes by the severe though generally short gales met with between the tropics, in the time

time of the westerly monsoon. These latter gales may also send Rollers toward the N.W. side of Ascension."[*]—"Geog. Journal," Vol. VI. page 335.

Sir R. Schomburgck, in the before-mentioned paper, states, "The period when the ground-sea sets in is generally October, and it continues, though with some intermission, till April and May. Any individual acquainted with the coasts of North America will be aware that during that time frequent storms prevail, and the circumstance that a northern wind either precedes, sets in with, or follows a ground-sea, and that only the northern side of the West India Islands are exposed to it, confirms me in my opinion, that it is caused by gales in the Atlantic, or on the northern coasts of America."—"Journal of the Geographical Society'," Vol. V. p. 24.

Their simultaneous occurrence at St. Helena and Ascension, as described on the preceding page, is an additional proof of their distant and similar origin.

The diminished pressure of the atmosphere, indicated by the fall of the barometer, during the period of the hurricanes, and the probably consequent elevation of the level of the sea at that place, from this cause, will also tend to explain their origin; for after the storm had ceased the sea would naturally fall,[†] perhaps to a lower level than usual, and thus give an additional impetus to the waves, risen by the tremendous effects of the wind.

These waves, which increase in magnitude and velocity in their onward progress from the centre, from their becoming merged and united, and thus attaining a regularity and height quite distinguishable from the ordinary swell of the ocean; as may be seen on a small scale, by the concentric ripples caused by dropping a stone into the smooth waters of a lake, and thus when they arrive at any point which interrupts their course, the magnificent effects described occur. These waves, which obviously would be heightened in their effects and continuance by the wind blowing in the direction of their course, would proceed onward until their velocity and diminished elevation are entirely spent.[‡]

By the magnitude of the wave is not meant the actual height of it, but rather its breadth; for as the larger the wave the greater is its velocity, and therefore it will have a greater effect when striking against a shore.

Another cause of the rollers, ground swell, or ground sea, may be an earthquake; but as these are but of rare occurrence, and of short duration, the larger number of these phenomena cannot be referred to such an origin.[||]

For other particulars concerning them, the reader is referred to the "Atlantic Memoir" and the "Colombian Navigator," Vol. III.

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[*] "The heavy rollers which sometimes set in upon the coasts of Chili and Peru, led me to seek for proofs of the causes being such as I then suspected. But there is at times another kind of "Rollers," which are perhaps caused by an earthquake.—*Ibid*, p. 336.

[†] "Before a hurricane at the Mauritius, the water rises considerably, and is agitated. In other parts of the world the sea rises before a storm some feet above its usual level. At the same time, mercury in a barometer falls. Is not this rising of the waters caused by diminished pressure of the atmosphere at those places, while at other more distant parts there is an increased pressure?"—*Captain FitzRoy.*

The *seiches* of lakes and inland seas, described by Colonel J. R. Jackson, in the "Geographical Journal," arise from the same cause. One portion of the Lake of Geneva, the Baltic, the Caspian Sea, or the Mediterranean, being frequently observed to rise or fall below their usual level, without any apparent or adequate cause.—"Geographical Journal," Vol. III., p. 271.

[‡] That this distance is very considerable at times, may be inferred from the fact that "heavy rollers, at times (though rarely) set into Good Success Bay, in the Strait of Le Maire."—"Voyages of the Adventure and Beagle, Vol. 1., p. 456.

[||] "Edinb. Roy. Trans.," Vol. VII. p. 154.—Waves from earthquakes, and also "Journal of the Geographical Society, Vol. VI. p. 322, et seq.

The following remarks by Lieut. Langham Rokeby, R.M., in charge of the observatory at Ascension, dated April, 1866, will confirm in a great measure the proposition previously advanced, respecting the origin of the rollers, viz.: that they are caused by distant storms or cyclones. As will be seen, they are based on the personal observation of the author, and the records of the island for nearly 40 years :—

The phenomena of the rollers which occur at various times during the year on this island, as well as at St. Helena, have been, I believe, often commented upon, and their cause has been the subject of some little dispute; some persons maintaining that they are caused by volcanic eruptions, some by the return of the waters after having been heaped on by the action of the trade winds, and some by the rotation of the earth upon its axis. The most popular theory with the residents of this island is that of volcanic eruptions. I believe that Mr. Mallet's definition of an earthquake is, that it is the "transit of a wave or waves of elastic compression in any direction, from vertically upwards to horizontally in any azimuth through the substance and surface of the earth, from any centre of impulse or from more than one, and which may be attended with sound, and tidal waves dependent upon the impulse and circumstances of position as to sea and land."

If, then, the rollers were caused by an earthquake or by a submarine volcano, there would, in either case, be a volume of water forced upon the sea's surface, and each wave would be "propagated outwards over the surface of the sea, like the circles or ring-shaped waves on a pond when a stone is dropped into it;" and the direction of these waves might therefore be from any point of the compass. But with the "roller" this is not the case, for their direction is from the south-west, veering gradually by the West to north-west during the greater portion of the year, and from the north-east, changing their direction by the North to north-west, during the remainder of the year.

Again, if volcanic eruptions were the cause, the eruptions must be very numerous; and in order to produce the change in the direction of the rollers during their continuance, the seismic vertical must not only be varying every day, but must also vary in certain directions during certain portions of the year. The return of the waters, after having been heaped up by the trade wind, is a theory with which I am, to some extent, unacquainted; but is it not reasonable to suppose that the return of the waters would always be in a direction opposed to the south-east trade wind?—and during the calm which succeeds a strong trade wind should we not invariably have rollers? I have before stated that the general direction of the rollers is from the south-west; they are particularly heavy during the month of August, when the south-east trade wind blows with its greatest force. This would, therefore, seem a sufficient proof against this theory.

From the foregoing statement I should imagine that the theory of the rotatory motion of the earth would hardly hold good. The facts which I shall now lay before your readers are partly the results of my own observations, and have partly been ascertained from the records contained in the island journal since 1827. 1st. The direction of the rollers varies during certain periods of the year. 2nd. From November until February they commence from north-east and retrograde to the North and West; while from May until October their direction is from south-west, veering round by the West to the North. 3rd. In each case, the nearer their direction is to the south-west and north-east points at their commencement, so much the nearer are they, and the longer is their continuance.

These facts lead me to believe that the rollers are in some way caused by cyclonic storms. These rotatory storms have been proved to revolve against the sun in the northern hemisphere and with the sun in the southern; the waves, therefore, produced by these storms must necessarily move and change their direction in a similar manner. On reference to Maury's Wind Chart, it will be seen that the gales of wind, which are recorded to take place once at least in six days, reach as low a latitude as 25° N. from November until February in the northern hemisphere, but in the southern hemisphere during the same months they occur in such a small area that they need hardly be taken into consideration. As the direction of the northern storms is retrograde, the direction of the waves caused by these storms will be retrograde also. This is precisely the case with the rollers during this period. Again, from June until September the gales of wind prevail in the southern hemisphere, and the motion of these storms is direct; and I have observed that the rollers during this period follow the same law. This change in their direction was singularly exemplified last year by the occurrence of some extraordinarily heavy rollers, which commenced almost from south-west by South, and lasted about five or six days, changing their direction until they went down at N.N.W. There may, of course, be objections to the idea that they are caused by cyclones; but all I have wished to point out with regard to them is their coincidence in time and change of direction with these storms in each hemisphere.*

With this the subject may be satisfactorily closed for the present, but any additional feature which may be elicited as to their occurrence, by which they might be predicted, would be of great importance.

IV.—TEMPERATURE, DENSITY, DEPTH, ETC., OF THE OCEAN.

The topics which will be briefly adverted to on this section are rather subjects of interest to the general enquirer, than directly useful to the mariner in his vocation. Still they are important in generalising the current and wind systems, which are so necessary to be known, and they will afford gratification in collecting the evidence, which in an aggregate sense lead to important results.

1. TEMPERATURE AND DENSITY.

There is one singular fact, which appears to be gradually determined as observations on the specific gravity of the ocean water are multiplied; this is, that at a certain depth below the surface, beneath the effects of rain, evaporation, congelation, or the mingling of river waters, the density is very nearly uniform all over the world. This identity of constitution points to another conclusion—that the water of the ocean does circulate over and intermingle with every portion of the water-surface of the globe, in the same way that the atmosphere is continually changing and passing over every part of the globe in turn, thus becoming of one universal character, capable of sustaining life in any and every part of the earth.

This subject is dwelt on more at length in our Memoir for the North Atlantic, 1865, page 260, &c., and need not be further discussed here. But there is one brief report on the collected observations on density (above 50,000 in number) which were sent to the meteorological department under the late Admiral FitzRoy. The means of these observations are shown upon a chart, which is of great interest to the physicist, and will help us to arrive at many important conclusions.

The mean specific gravity of the whole of the North Atlantic from the equator to latitude 50° is 1·02664, while that of the South Atlantic between the corresponding parallels is 1·02676, showing an excess on the side of the waters South of the equator, but only of ·00012.

The accession of the River Plata has considerable influence in diminishing the density of the sea in its vicinity, and by omitting all observations above 30° North and 30° South, the mean densities become respectively 1·0267 and 1·0271; that is to say, between the equator and 30°, the southern waters are heavier than the northern by ·0004.

This difference is less than has hitherto been generally supposed, and even *this* exists only between the equator and 20°, and is chiefly occasioned by the greatly diminished density of the water between the equator and 10° N. in the belt of equatorial calms and rains.

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* Athenæum, June 9th, 1866, pp. 777-8.

NORTH AND SOUTH ATLANTIC OCEANS.

50° North to 50° South.

Zones.	Means.		Maxima.				Minima.				Extreme Range.		Approximate Number of Observations.
	Specific Gravity at 62° F.	Temperature.	Specific Gravity.	Long. W.	Temperature.	Long. W.	Specific Gravity.	Long. W.	Temperature.	Long. W.	Specific Gravity.	Temperature.	
North.		°		° °	°	° °		° °	°	° °		°	
50° to 40°	1·0260	57·5	1·0304	30 to 40	79	30 to 40	1·0099*	St. Law.	32	50 to 60	0205	47	4,000
40° to 30°	1 0271	67·0	1·0323	20 „ 30	81	40 „ 50	1·0239	30 to 70	49†	60 „ 70	0084	32	2,300
30° to 20°	1·0274	75·1	1·0312	40 „ 50	85	70 „ 80	1·0235	30 „ 40	58	20 „ 30	0077	27	2,100
20° to 10°	1·0270	77·8	1·0313	20 „ 30	83	20 „ 30	1·0198‡	20 „ 30	64	17 „ 20	0115	19	2,000
10° to 0°	1·0257	80·4	1·0318	20 „ 30	84	20 „ 30	1·0206§	50 „ 60	74	20 „ 30	0112	10	3,000
South.													
0° to 10°	1·0270	77·4	1·0308	30 „ 40	84	10 „ 20	1·0159§	10 „ 12	69	10 „ 12	0149	15	2,400
10° to 20°	1·0272	73·0	1·0311	30 „ 40	83	30 „ 40	1·0247	30 „ 40	90	10 „ 12	0064	23	2,100
20° to 30°	1·0271	69·4	1·0318	30 „ 40	83	30 „ 40	1·0196	Rio.	56	20 „ 30	0122	27	2,600
30° to 40°	1·0265	62·3	1·0312	30 „ 40	80	30 „ 40	1·0185	20 „ 10	45	0 „ 10	0127	35	3,700
40° to 50°	1·0260	51·2	1·0293	30 „ 40	66	20 „ 10	1·0226	20 „ 10	33	0 „ 10	0067	33	1,400

* Near the entrance to the St. Lawrence, and affected by the fresh water.

† 33° is *said* to have been met with near the American coast in January.

‡ After much rain. H.M.S. "Boscawen."

§ The ship "Victory," while trading on the African coast, found the specific gravity lower on several occasions—1·0164, 1·0130, 1·0129, 1·0167.

In a log kept by Admiral Sir Frederick Grey himself on the coast of Africa there is the following passage: "At the surface of the water, after we anchored, the stream of brown Congo water prevailed generally, while at a little depth below the green salt water was seen, and the variations in density (by hydrometer) 1·0247, 248, 241,202, depend on the eddies which sometimes brought up the water from below." At bottom—temperature 72°, density 1·0252; at surface—temperature 75°·9, density 1·0202.

Though but little *heavier* the South Atlantic is decidedly *colder* than the North, nearly five degrees, their mean temperatures being 71°·6 and 66°·7 respectively, and that this difference is tolerably uniform parallel for parallel is evident by the thermal curves that have been projected.

Changes of temperature in sea-water are frequently abrupt, and in studying the temperatures on the outline chart accompanying these observations, it should be borne in mind that it is the fact of those temperatures being the means of all observations within squares of ten degrees that causes the transitions to appear gradual.

When H.M.S. *Nile* was going from Halifax to Bermuda, in May, 1861, Admiral Milne found the temperature 70° at the bow, while only 40° at the stern, as he entered the gulf stream.

In the neighbourhood of the Cape of Good Hope the changes of temperature are, as is well known, both sudden and frequent:

The register of H.M.S. '*Encounter* states, that when in 39° 30′ S 15° E. in February, 1860,—" At 6 a.m. upon drawing water from alongside it appeared quite warm to the hand," and the temperature was found to be 72°, which was 17° higher than it had been the previous day at noon, when the ship was in the same latitude, but 1° 53′ further to the westward. The specific gravity (*uncorrected* for temperature) continued unchanged at 1·0285, and a northerly current of 19 miles had been experienced.

The *Sebastian Cabot*, Captain Quirk, in very nearly the same position, and in the same month, found the surface temperature at 6 a.m. to be 57°, at noon 73°, and at 6 p.m. the same day 76°. This was in latitude 39° 25′ S. and longitude 16° 30′ E. to 18° 30′ E., current E.N.E. about 12 miles per 24 hours.

Further to the southward, the *Pomona*, Captain Bergen, latitude 41° to 43° S., long. 15° to 25° E., found the temperature of the water varying from 48° to 64°, changing frequently; though no great difference was observed in the specific gravity (uncorrected).

In illustration of the effect of heavy rains, in at least temporarily diminishing the specific gravity of the surface, a most remarkable instance was observed by Dr. C. K. Ord, of H.M.S. *Hermes*, when that ship was lying in Simon's Bay in August, 1859. On the 4th of that month, at 9 a.m., the specific gravity was 1·0266, and in one hour it was reduced by the heavy rain that fell to 1·0193, the water becoming " brown in colour, merely brackish in taste, and its current setting distinctly outwards." By noon the density had increased to 1·0253, and at 3 p.m. the surface had recovered its former density of 1.0266. The next day the specific gravity was again reduced by heavy rain and again rose. The *temperature* of the surface was also temporarily lowered from 58° to 55°, the temperature of the rain being 50°.

The question of the dynamical effect of temperature on the ocean, and of its relation to the density of the water, has been carefully discussed in the United States Meteorological Bureau, and Captain Maury endeavoured to ascertain by direct experiment what the amount of this effect was. He had delicate thermometers made, by which the relative increase in volume of sea-water with the well-ascertained increase in mercury at varying temperatures, and thus to arrive at some hitherto occult law which might govern the motion of the great mass of ocean water, or of some portion of the changes which are at present hidden in the greatest obscurity. But it may be fairly but deferentially questioned, whether the minute means employed were in any way commensurate with the vast problem they had to solve; whether the existence of a minute amount of air in the water might not invalidate their results, and give rise to conclusions more in error than the quantities they are intended to eliminate. The idea obtained was that there is a thermal tide which ebbs and flows but once a year. In his famous Sailing Directions, 1858, vol. i. pp. 253—255, Maury thus speaks on this subject:—

At sea, between 35° or 40° and the equator, evaporation is in excess of precipitation; at any rate, there is but little precipitation except under the equatorial cloud-ring; and though, as we approach the equator, on either side, from these parallels, the solar ray warms and expands the surface-water of the sea, the winds, by the vapour they carry off and the salt they leave behind, prevent it from making that water lighter.

Thus, two antagonistic forces are unmasked, and, being unmasked, we discover in them a most exquisite adjustment—a compensation—by which the dynamical forces that reside in the sunbeam and the trade-wind are made to counterbalance each other; by which the climates of intertropical seas are regulated; and by which the set, force, and volume of oceanic currents are measured.

The compensation is most beautiful; it explains the paradox, gives volume to the harmonies of the sea, and makes them louder in their song of Almighty praise than the music of many waters.

Suppose there were no winds to suck up fresh water from the brine of the ocean; that its average depth were 3,000 fathoms; that the solar ray were endowed with power to penetrate with its heat from the top to the bottom; and that, from bottom to top, the seas of each hemisphere, in thermal alternation with the seasons, were raised to summer heat and lowered to winter temperature; the change of sea-level from summer to winter, and from winter to summer, in one hemisphere, would, from this cause alone, be upwards of 125 feet; and in its rise and fall we should have, from pole to pole, the ebb and flow of a great thermal tide that would turn with the sun in the ecliptic, and tell the equinoxes by the march of its rising and falling waters on the tide staff.

But difference of level would not be all that would give strength and volume to this tide; difference of specific gravity would lend its weight as so much dynamical force, which difference would create an upper and under annual tide, from one hemisphere to the other. This double disturbance of equilibrium would not give rise to a tidal wave—mere motion without translation—but to a tidal flow and reflow of water from one hemisphere to the other in volumes of vast magnitude, power, and majesty.

This is an exaggerated view of the dynamical force of the sunbeam; but it is presented to show the origin of these thermal tides. The difference between the actual and the supposed thermal tides is one of degree merely; for the sea-water that is liable to any considerable change of temperature, instead of reaching from the bottom to the top, is scarcely more than a "pellicle" to the ocean. It forms a stratum or layer which is thickest at the equator, and which comes to the surface near the polar edge of the temperate zones; it then dips again as it recedes towards the regions of perpetual winter.

The South Atlantic appears to be cooler and heavier than the northern. The season of observation, however, is southern fall and winter *vice* northern summer.

In January, February, and March the waters of the southern ocean are decidedly warmer, as at the opposite six months they are decidedly cooler, parallel for parallel, than those of the northern oceans. Thus periodically differing in temperature, the surface-waters of the two hemispheres vary also in specific gravity, and give rise to an annual ebb and flow—an upper and an under tide—not from one hemisphere to the other, but between each pole and equator.

In contemplating the existence and studying the laws of this thermal tide we are struck with the compensations and adjustments that are allotted to it in the mechanism of the sea; for these feeble forces in the water remind one of the quantities of small value—residuals of compensation—with which the astronomer has to deal when he is working out the geometry of the heavens. He finds that it is these small quantities which make the music of the spheres; and so, too, it is the gentle forces like this in the waters which preserve the harmony of the seas.

Equatorial and polar seas are of an invariable temperature, but in middle latitudes the sunbeam has power to wrinkle and crumple the surface of the sea by alternate expansion and contraction of its waters. In these middle latitudes is the cradle of the tiny thermal tide here brought to light; feeble, indeed, and easily masked are its forces, but they surely *exist*.

It may be that the thermometer and hydrometer are the only instruments which are nice enough to enable us to detect it. Its foot-prints, nevertheless, are well marked in our tables, showing the thermal dilatation of sea-water. The movements of the isothermal lines, marching up and down the ocean, show by signs not to be mistaken its rate and velocity. These movements are well represented on the thermal charts. The tiny ripplings of this feeble tide have, we may be sure, their office to perform in the general system of aqueous circulation in the sea. Their influence may be feeble, like small perturbations in the orbits of planets; but the physicist is no more at liberty to despise these than the astronomer is to neglect those.

The problem that we now have in hand, and which is represented by the diagrams of this plate, is to put the seas in scales, the ocean in a balance, and to weigh in the specific gravity bottle the waters of the northern with the waters of the southern hemisphere.

It would appear that the waters of the South Atlantic are decidedly both cooler and heavier, parallel for parallel, than the waters of the North Atlantic; but this difference may be more apparent than real, for the observations were made in the northern summer on this side, and in the southern fall and winter on the other side of the equator.

Had we a series of observations, the converse of this, viz.: winter in the North Atlantic, summer in the South, perhaps the latter would then appear to be specifically the lighter; at any rate, the mean summer temperature of each Atlantic, North and South, is higher than its mean winter temperature, and consequently the specific gravity of the waters of each must change with the seasons. A diagram—had we the data for such an one—to show these changes, would be very instructive; it would show beautifully, by its marks, the ebb and flow of this new-born tide of the ocean.

2. DEPTH OF THE OCEAN.—The experiments that have been made for ascertaining the depth of the South Atlantic have been much less numerous than those to the North of the Equator, and those recorded are much less conclusive. In the North Atlantic Memoir, 1865, pp. 697—703, the particulars and list of the soundings which have been made North of the Equator, have served another purpose in Atlantic hydrography,—they have disproved the existence of by far the greatest number of reported shoals and dangers, to test which many of them were made. In the South Atlantic, on the other hand, these vigias and vaguely determined rocks are very few in number, and the deep sea lead has not been applied to their verification and disproof.

Notwithstanding the careful experiments which have been made on the South Atlantic, our conviction is, that they are all, or almost all, of a negative character; that is, that the enormous length of line run out in some cases does *not* show the true depth of the ocean.

This doubt we have expressed and assigned reasons for in other places, and it may here be briefly stated that the lead, in most cases, has apparently drawn out the line at very irregular intervals, which a spherical shot would not do, and that it is more than probable that the bottom has been reached very much within the depth apparently shown by the sounding line. For if it should pass through one or more opposing submarine streams, such as those described in the Atlantic Memoir, 10th edition, pp. 260, 261, and which it is tolerably certain that they would do in some greater or less degree, this movement of the water would carry the line off the reel with double its velocity, or, in many cases, with a speed quite equal to that with which it would be drawn by the sounding weight. Also that the impact of a moving mass of water upon a line whose sectional area is equal to 50 square feet per 1,000 fathoms would be vastly greater than the force exerted upon it by a sounding weight, which would consequently be drifted away by the line. The friction of a tortuous line, its buoyant power, and other reasons also, may be brought forward to invalidate the conclusions drawn from these experiments.

It may therefore be stated, that when the line at these great soundings does not run out with a regularly decreasing rate, that some other cause is in operation to cause this irregularity, and that it does not show the true depth. Besides this, the *exact* drift of the ship or boat should be taken into account, as any motion from the true perpendicular will cause the resulting depth to be not the hypothenuse of a right-angled triangle, whose base is equal to the drift, but the perpendicular to the base and a *curve* formed by the sounding line.

In the *Atlantic Memoir*, above quoted, this subject is given more at length, and details of numerous experiments will there be found; to them may be added some made by Captain Sir Edward Belcher, in H.M.S. *Samarang*, off the West coast of Africa, which are recorded in the "Nautical Magazine," 1843, p. 796. The results of these, it will be seen, coincide with those which are there given.

On the 20th of March, 1843, being in lat. 0° 24′ N., long. 10° 37′ W., an attempt was made to obtain soundings. It broke or ceased to descend (suddenly) at 3,065 fathoms.

On the 25th of March, 1843, in lat. 4° 14′ 35″ S., long. 9° 37′ 39″ W. (500 miles southward of Cape Palmas), a weight of 14 lbs. was attached, and struck soundings at 1,620 fathoms; but 5 fathoms were hauled in to bring it nearly vertical. No perceptible current, but the ship drifted about 1 mile to the south-west during the operation, which I attributed to the breeze and being hove to.

On the 13th of April, being becalmed in lat. 35° 50′ S., long. 1° 54′ E. (840 miles westward of the Cape of Good Hope), another attempt was made at deep-sea soundings, but the line parted without any surface strain at 1,270 fathoms.

Captain Sir James C. Ross, in H.M.S. *Erebus*, also obtained soundings in this part; we subjoin the particulars of this experiment. It was in lat. 33° 21′ S., long. 9° 4′ E. March 3rd, 1840.

"I have just obtained another deep sounding (in 2,677 fathoms), and although we have not yet been able to get down so far as I wished, and still hope to do, I am quite satisfied that if we get into any sea deep enough, we shall have no difficulty in accomplishing it. The weight employed was 540 pounds, and we had on the reel something more than 5,000 fathoms of line; the first 437 fathoms were a single strand of whale line; the rest was of two strands of three-yarn spun yarn.

"Crozier took down the time of each mark passing off the reel; and when the weight touched the bottom, it stopped so suddenly, the boats' crews all called out, 'It is down.' We veered away 50 fathoms afterwards, and then hauled in again, but could not get an inch more than the mark at which it first struck. Nothing could be more satisfactory than this sounding, and it is the more so from showing very plainly that we have the means of getting soundings, however deep the sea may be, and I trust our next trial will be in deeper water. I have ordered the line to be again completed to 5,000 fathoms."

The foregoing will give sufficient idea of the details of these interesting experiments. But the great depths there recorded have since been far exceeded. Without including the great sounding of 5,700 fathoms, tried by Lieut. Walsh, U.S.N., in the *Taney*, November 15th, 1849, in lat. 31° 59′ N., long. 58° 43′ W., three others of still greater depth have been tried. One in the North Atlantic, by Lieutenant O. H. Berryman, U.S.N., in the *Dolphin*, February 12th, 1853, in the North Atlantic, in lat. 32° 55′ N., long. 47° 58′ W., when 6,600 fathoms were veered out. The others were Lieutenant J. P. Parker, of the U.S. frigate *Congress*, April 4th, 1852, in lat. 35° 35′ S., long. 45° 10′ W., when the cast was 8,300 fathoms; and the other by Captain Denham, of H.M.S. *Herald*, October 30th, 1852, in lat. 36° 49′ S., long. 37° 6′ W., of 7,706 fathoms.

Of the relation between the depth and the rate of the propagation of the Tidal and storm-waves, it will be needless to speak, as our knowledge is much too limited to be brought to bear on those topics. We have no satisfactory examples, either of the nature of the bottom, which has been found to be of such surpassing interest to the naturalist, consisting in some parts almost exclusively of living organisms, as described in the "North Atlantic Memoir," 1865, pages 336—338.

III.—ANIMAL LIFE.

"The curious on board ship sometimes amuse themselves by letting overboard, in light winds and calms, a hoop-net of gauze, or other light material, to 'catch insects of the sea' crumbs of bread or other food that will attract them are sometimes placed in it as bait. The hoop is to keep the mouth of the net open and prevent it from collapsing into folds and crushing its spoils as it is hauled up; and these, when they are received on deck, are regarded by all on board with amazed interest and curiosity.

"But wait until the microscopist mounts them on his slides, and brings the powers of his instrument to bear. Then every one who looks marvels at the beauty and variety of organic form there presented, and the beholder is at once struck with the extent, the resources, and the richness of the new field of research, into which he has now, it may be for the first time, had the opportunity of casting a look. He fully realizes the idea that the organisms of the sea are as multitudinous as its waves, and as marvellous as its wonders.

"With such a subject for study and contemplation as these insects afford to all who can use the microscope, let no naturalist who crosses the ocean, and no passenger on board ship, or mariner, who can afford to purchase a microscope, talk hereafter about the monotony of a sea voyage, or the *ennui* of a passage. More varied, strange, and new than the insect life of *terra firma*, the entomology of the sea, if we may so style the families of its little crustaceæ, medusæ, and zoophytes, offers quite as profitable and as instructive a field of investigation as does the entomology of the air.

"The floating crustaceæ of the high seas are classed by naturalists a little lower than the insects of the air, yet, in the scale of being, they rank higher than the worms of the earth. Every one who, with an eye for the microscope, goes to sea may help, with proper drawings and descriptions of what comes to his net, greatly to enrich this field. Not only so, these mites of moving creatures will tell us in their mute way, if we consult them aright, of all the currents, polar and equatorial, that help to regulate the climates of the great deep. They may be regarded as tallies to the water by which the system and channels of oceanic circulation are to be pointed out and made visible, as it were, to the eye of science."—*Captain Maury.*

This "*New Field*," as it is termed by Maury, can be readily explored by any one who will take the trouble to do so. A simple contrivance, if a microscope is not at hand, will afford the means. The eye-piece, or first joint of an ordinary telescope, is a very good substitute. To use it for the transparent objects, which the minute inhabitants of the surface-waters generally consist of, place them in a drop of water on a piece of glass, held or fixed horizontally a few inches above a sheet of white paper or a looking-glass, and the telescope joint held by the lower part at from a quarter to half an inch above the surface of this glass, will make an excellent microscopic tube of great power, sufficient to show many of the singular forms and great beauties of the animalculæ, which can be easily collected in vast numbers.

The best or readiest way of obtaining them is to tow a small net, consisting of a hoop one, two, or three feet in diameter, on which is strained a piece of bunting or fine gauze, and this being drained occasionally into a vessel, will afford an abundant harvest. The floating weeds also contain great quantities of minute living creatures, which may be taken by the same means.

It would be entirely beyond the province of this work to deal with the characteristics and families of these inhabitants of the seas, although much good may be done, hydrographically, by the study of their distribution. This subject must be pursued in other works, although unfortunately they are generally of a very expensive character. In the eighth edition of Maury's Sailing Directions is given an extensive series of coloured drawings and descriptions of some of the specimens taken on board Captain Toynbee's famous ship *Gloriana*, from the pencil of his accomplished lady, the daughter of the late Rear-Admiral Smyth, to whom this work was originally dedicated. Maury published the following letter, which accompanied these drawings:—

"Ship *Gloriana*, en voyage, January, 1857.—My Dear Sir: Your very welcome and kind letter was awaiting us when we landed in Madras last month, for we had left England a day or two before it arrived. I assure you it was with sincere pleasure that Captain Toynbee heard that his logs were likely to be useful to you, for it is a grand thing to contribute even in the smallest measure to your excellent and noble work. The log this voyage will comprise a little further experience of the Indian Seas; for we came up the Bay of Bengal in company with a cyclone, making use of it till the furious squalls and disturbed sea warned us to stop, and most surprised all the passengers were when they heard the order given to heave to, and to learn what it was that we were to avoid. Captain Toynbee had confided his suspicions of our terrible neighbour to me for some days, and most interesting I had found it to watch the gradual changes of wind which were to prove the truth and importance of the circular theory; and when we were the first ship to anchor in Madras Road, all that had been there before having been obliged to put to sea, the chorus of praise on this simple but effectual nautical science was universal.

"We have since found that on a night while we had theatricals performing on board in the open air, a ship only 195 miles from us was exposed to all the fury of the wind, sea, rain; whilst four ships on shore, and, more dreadful still, the wreck of a vessel's stem, formed into a raft—but with no men on it—completed the horrors of the day; all this, however, is described at length in the log, and that will tell you, too, that the rest of our voyage was rough, rough outwardly, but smooth and pleasant inwardly; for both the passengers and the detachment of the 12th Lancers on board seemed to vie with each other in smoothing over the discomforts of high seas and incessant rain; * * * indeed, we thought that the rough weather seemed just to afford that relief from the monotony and *ennui* of a long voyage, which people in general will not look for in occupation. As for ourselves, we have found a new and most engrossing interest in sea life in examining the sea water with the microscope, of the results of which we have since found that you give specimens in the last edition of your Sailing Directions. Unfortunately, Captain Toynbee had not reached the appendix in looking through it before leaving home, else we should have provided ourselves properly for carrying on the search. The surgeon of the Lancers, Mr. Wrench, luckily had his microscope with him, and was enthusiastic and skilful in the use of it, and he and my husband used to spend many hours at first trying to catch these delicate organisms. 'Oh,' Mr. Wrench sighed 'if I had but a test tube here.' A hydrometer had been accidentally broken a few days before, and supplied the very thing we wanted, and then all went on prosperously; each day exciting in us more and more admiration for the marvels around us. That rough foaming sea to abound with this minute life, exquisitely coloured, and each of the many legs of the little crustacæ beautifully feathered and fringed, seemed a wonder of which we could never tire, and much as we liked Mr. Wrench personally, our regret when he left us was much increased by his microscope going with him. He is already at work with it on the fresh water insects in Poonamalee, whilst a kind friend in Madras has lent us his, so that the bucket of water drawn for trying the surface temperature is a perpetual feast. We shall be very much interested in hearing whether the sketches we shall send you resemble those you have had from elsewhere. I fear that I am taking up too much of your precious time with my long letter, but it is a real treat to speak, even on paper, to anyone who thoroughly appreciates the grandeur and glory of the sea. What new lights you have thrown upon it in your Physical Geography, and how shall I thank you sufficiently for that charming work? We rewarded Mr. Wrench for his microscopic work by letting him read it, and agrees with us in the dignity and sublimity of its views. * * * Believe me your truly obliged, Ellen P. Toynbee."

The works of D'Urville, Dana and others will afford abundant interest, as will the observations of Captain R. W Foster, of Liverpool, whose log of the ship *Metropolis* has been given in Maury's Directory. A few words by the Arctic traveller, Dr. Sutherland, F.R.G.S., on this subject, arising out of his passage to Algoa Bay in 1854, will be a fitting adjunct to what has been said previously:—

It may, however, be proper to observe, that every part of the ocean where the towing-net could be applied satisfactorily, for the purpose of including whatever came into its way, was found to contain crustacea, chiefly of the Entomostracous orders, in considerable abundance. The genus *Cypridina*, of which but little is known, and in some instances supposed to be dredged from depths of sixty to seventy fathoms on the British coasts, was found of large size at the surface of the ocean in both the northern and southern hemispheres, in localities determined astronomically, where Sir J. Clark Ross failed to strike soundings with 2,000 fathoms of line. This genus, however, has been found in several parts of the Southern Ocean by Mr. Adams, Assistant-Surgeon, R.N., and other travellers.* The genus *Anomalocera*, and several other closely-allied genera of this widely-distributed order, hitherto chiefly confined to the British seas and most northern parts of the North Atlantic, were found extending southward of the Equator—species apparently the same having been taken in the English Channel, the Bay of Biscay, and in 4° to 6° of S. lat., on the 20th to the 25th meridian of W. long. In no part, however, traversed during the passage did this order occur as on the Agulhas Bank, where many thousands of the most beautiful and lively creatures were often found to be included in the net after two or three minutes' towing over the stern of the ship during almost a perfect calm. In the daytime it was remarkable how few of the *Entomostracous* order, or even of any crustacea, were taken up when the net was towed along the surface: when lowered with a weight to a depth of 10 to 20 fathoms the success was much better; but still the numbers, taken under the most favourable circumstances during broad daylight, were only an infinitesimal fraction of the myriads taken from the surface after nightfall. A few mollusca, the young of the *Argonaut*, several species of *Pteropods*, the beautiful purple Atlantic gasteropod, *Ianthina fragilis*, and a few tetigerous annelides, were taken in much the same proportion by night as by day; and, as might be expected, acaleph forms were also found equally numerous in daylight and after night had set in. This fact, with respect to the habits of marine animals, and the periods at which they resort to the surfade of the water, is worthy the notice of naturalists, as it may in some measure account for the paucity of crustacean forms, not unfrequently complained of by several most careful observers.†

Luminosity of the Sea.—The luminous appearance of the sea at night has often been the subject of wonder and reflection. This light, when excited by the ship's rushing through the water, assumes the form of brilliant stars, or round masses of greenish hue, frequently 18 inches in diameter. They float by the vessel in every part of the water which her bottom has touched, as deep as the very lowest part of the keel, and form behind her a long and fiery train. At other times, when the breeze is strong, and the billows break and foam, this light appears like fields of flashing fire. Twice, says Mr. Luccock, I have beheld this latter sight in all its splendour; the water was highly luminous, so far as the eye could reach, and the vessel seemed to be plunging her way over billows of liquid fire. In both instances the night was dark and lowering; and the brilliance of the water formed a grand but awful contrast with the black concave above us. When daylight returned, all this heatless splendour was eclipsed, and the sea exhibited, to a superficial view, only a more dingy colour than usual; to a more close examination it presented myriads of hemispherical bodies of the medusa tribe.

This luminous appearance arises from the presence of several kinds of animated beings, which have the power of emitting a phosphorescent light. This is evident from the multitude of them which may be taken out of the sea, and still appear lucid and active. Another great cause may probably be found in the disorganization and putrefaction of animal substances; this light abounding on all beaches where the refuse of large cities is discharged. Friction, in most cases, seems to assist in the production, if it be not in all essential to the existence, of this brilliancy. The slight agitation of the water, occasioned by the action of a steady breeze upon its surface, is often sufficient for the purpose; and in cases where plants are taken up, inhabited by minute animals, exposure to the passing air alone seems to be enough.

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* Baird's British Entomostraca.

† Journal Royal Geographical Society, vol. xxv., pp. 257-8.

That this luminous quality is not confined to the surface of the water, where, for the most part it appears in the English Channel and North Sea, is evident to all who have passed the tropics, and may be clearly proved to those who have not; for the shark, when he has taken the bate at night, and finds himself hooked, generally plunges downward, if line enough be given, many fathoms below the bottom of the vessel, and is visible even there by the light which he creates around himself, while floundering in the water. That the light in question does not proceed from his own body, but from the water which he agitates, or rather the matter which it contains, is manifest; because the larger living fishes, as they dart around and beneath us during the obscurity, leave behind them long lucid trains, just of the same kind, and in the same manner, as the vessel herself does.

This milky appearance of the sea water, proceeding from some phosphorescent substance contained in solution, is one peculiarity of the salt water of the sea; for if there was more salt contained in it, animal substances, it is probable, would not sufficiently decompose to produce this luminosity; and, also, this phenomenon is never observed in fresh water. The experiments of Mr. Canton, on phosphorescent substances, have arrived at this conclusion, and much of the luminous appearance of the ocean may be safely referrible to this cause.

For Commodore Krusenstern's remarks on the phosphorescent insects, see the "Memoir on the Atlantic," 8th edition, page 240. The milky whiteness of the sea, described by Captain Tuckey, has been seen in other places, heretofore noticed. Dr. Francis Buchanan has given a particular description, from its appearance in the Indian Ocean, between the Seychelles and Bombay, lat. 6° 32′ N., long. 61° 25′ E., 31st July, 1785. That description is as follows: "About 7^h 15^m p.m., the sea was observed to be remarkably white; the sky was everywhere clear, except around the horizon, where, for about 15 degrees, it was covered with a dark haze, as is usual in such latitudes. The whiteness gradually increased till 8^h 30^m; the sea was then as high coloured as milk, very much resembling the milky way in the heavens, the luminous appearance of the sea resembling the brighter stars in that constellation. It continued in this condition till past midnight, and disappeared only as daylight advanced. The whiteness prevented us from being able to see either the break or swell of the sea, although both were considerable, as we knew from the motion of the ship and the noise. There was much light upon deck, as we could discern all the ropes much more distinctly than usual. We drew several buckets of water, in which, even when at rest, there appeared a great number of luminous bodies. The bulk of them did not appear to be more than a quarter of an inch in length, and nearly as much in breadth. Some, howevor, were 1¼ inches long, and of the same breadth as the others. These were seen to move in the same manner as a worm does in water. When taken upon the finger they retained their shining faculty even when dry. When brought near to a candle their light disappeared, but by minute attention, an extremely fine filament could be observed and lifted upon the point of a pin. It was of an uniform shining colour and form, and about the thickness of a spider's thread. In a gallon of the water there might be about four hundred of these animals emitting light. The water itself, when in the bucket, had a natural appearance. The atmosphere was seeemingly free from fog. The stars were bright, and there was no moonlight."

The medusæ and animalculæ, which occasion the usual luminous appearance of the sea, emit light mostly when strongly agitated; and hence appear chiefly when close by the sides of the ship, or when any large fish passes swifty, or when a bucket of water is drawn, and the water is suddenly poured out. In doing this, I have often observed that one of the animacules stuck to my hand, and shone for a little, but as hand dried the light disappeared, so that I never could bring the animal to a light so as to discover it by a magnifying glass. So much seems necessary to explain what

I observed on the 31st of July, 1785, when the luminous animals were not only larger and more numerous, but also emitbed a stronger light than usual.

In the year 1805, in returning from St. Helena to England, a little North from the equinoctial line, and at no very great distance from the coast of Africa, I had an opportunity of seeing a still more splendid appearance of the luminous animalcules. Soon after dark in the evening, it being nearly calm, we saw numerous lights at a distance, like the lamps of a great city. The lights gradually approached the frigate, and on reaching us appeared to arise from a great many large fishes (albicores) sporting in the water, and agitating the animalcules so as to excite their luminous powers.

Of the Molluscæ or Medusæ (vulgo Sea-Blubber) there are very numerous species, consisting of a tender gelatinous mass, of various figures, most of which, by their phosphoreous quality, shine with great splendour in the water. In the supplement to the "Nautical Magazine," 1834, is a description of them, as taken up in different parts of the ocean, with an engraving, exhibiting the curious figures of 16 different species, and which, therefore, is recommended to the notice of the reader.

Mr. Webster says, "During the long calms by which we were delayed in the vicinity of the equator, I had an opportunity of examining several kinds of medusæ, or the sea-blubber. One day, while some of our crew were bathing in a sail, secured for the purpose by the side of the vessel, several of them were severely stung by these medusæ; and Mr. Miers, the carpenter, was so much injured by them as to be unable to swim. He suffered much pain and irritation in consequence, but nothing further. I have frequently handled them, and immediately afterwards, on applying my hands to my lips and face, have experienced some degree of pain; from which I am inclined to believe that it proceeded from the secretion of some acrid matter, rather than from any electric property. I contracted a disease on my hands, much resembling the itch, in consequence of handling the medusæ and the *Physalis*, or as it is commonly called, the *Portuguese man-of-war*."

"Medusæ, or blubber, are generally supposed to consist of slimy gelatinous matter but they are merely hydrophanes, or water cells, analogous to the vitreous humour of the eye; for, when punctured and hung up to drain, the water runs from them, and leaves an almost impenetrable shred of membrane; and yet this lives, and is capable of considerable motion."—Vol. I., p. 22.

Mr. Webster adds, "In the early part of December, 1828, in the Harbour of Staten Island, where the ship was then lying, the water was covered with medusæ, and on the following night the most brilliant illumination ensued. In size these medusæ varied from 1 to 8 inches long, and were bell-shaped, or like a mitred cone, but frequently assuming different figures."

On the shores of Staten Island, "I have sat in silent contemplation of the wild scenery around me, till startled from my reverie by the encroaching waves of the returning tide. It is a glorious sight to observe the fecundity of nature, and the boundless profusion of the Almighty's works, which gives to every drop of water its appropriate being! All teems with existence, and is crowded with inhabitants."

In lat. 2° 10′ N., long. 15° 42′ W., 26th of April, 1824, at 9^h p.m., the sea appeared uncommonly luminous. Captain Livingstone, in the brig *Jane*, was then on his way towards Valparaiso, and his remarks follow:—"A multitude of molluscæ were floating past, of a quadrilateral form, 2½ inches long, 1½ broad, and nearly half an inch thick, with an aperture, open at the front end, two-thirds of the length; many were caught, and when gently pressed edgewise, a good deal of water ran from the aperture, and they remained of a round form, rather inclining to conical; not unlike a thimble protracted until its length becomes double, in proportion to its diameter. They were very luminous: the light they emitted seemed voluntary, and was of a bluish colour, alternating with white. Their appearance was jelly-like, in the light of a candle in the cabin, something like the *sepia*, or cuttle-fish, and having much of the same jelly-like appearance. There were tubercles on them, very irregularly placed, and each seemed to be a little spark of light, as if the light was principally, if not entirely, emitted from the tubercles. They were yerfectly innoxious; no uneasy sensation being experienced either on handling them or afterward.

"I have been thus particular in my description of them, because I never saw any like them before nor since, nor have I been able to meet a single individual who had, though I have attempted to describe them to many old Brasilian traders.

"Their general colour, exclusive of their luminosity, seemed a light greyish blue or bluish grey, something like starch, with a little Prussian blue mixed in it."

On the night of the 30th of May, 1828, in H.M.S. *Chanticleer*, near the Cape Verde Islands, at about 10 p.m., the vessel sailing through the water at the rate of about 5 knots, the weather clear and the stars shining brightly "our attention was suddenly attracted by a great number of dolphins about the ship, and darting about in all directions with the swiftness of an arrow. The water was extremely brilliant, and appeared to be a sea of stars, so numerous were the specks of light; and the wake of the vessel, as she passed through it, was marked by one continued train of light. But beautiful as this was, we had been in some degree accustomed to it, and our attention was directed to the dolphins. We could distinctly see their whole form to a considerable depth below the surface of the water, from the bright light which they emitted, and were delighted with their gambols. A train of vivid light, not unlike that left by a rocket in its flight, but more continuous, suddenly appeared, and marked the dolphins to be in pursuit of prey."

Discoloured Water.—Mr. Luccock says, "In fine weather, near the Coast of Brasil, the ship frequently falls into *patches of water*, which exhibits a *brown and dirty appearance*, for several miles in extent. Strangers are apt to suppose that they are on the edge of a shoal; and more than once, he adds, I have seen the helm put hastily down, in order to avoid the supposed sand-bank. Yet the brownness of the water arises from the spawn of fishes; and, when examined by a microscope, or powerful lens, is found to be mingled with vast numbers of the small fry, which have just broken into active existence. They seem to have been deposited by their parents during the winter months; for I have noticed them from June to November; but not in March, April, nor May. They probably serve as food for those fishes which are more fully grown, or the ocean soon would be overstocked."*

Upon this passage, Lieutenant A. H. Bisschop Greevelink remarks, "I should question, with all deference, whether the depth of water in such places was tried to a sufficient degree of certainty.

"On our passage from the West Indies to Europe, in July, 1837, at about four in the afternoon of the 7th, a streak was observed on the surface of the sea, exactly in the same manner as Captain K. describes; and at the moment we passed over it, the lead was hove in a very proper manner, without finding bottom; but having lowered the boat, soundings were found to exist, although in more than 30 fathoms water. The latitude, computed from observations taken at noon, was 21° 12′ N., and longitude, by chronometer, 58° 42′ W."—See further on this subject, "Colombian Navigator," Vol. III., p. 32.

Although it is undoubtedly the case that discoloured water is an indication of shoal water, still in almost every long voyage some of this phenomenon is met with, far beyond the limit of soundings. We will subjoin a few extracts from the Journal and Remarks† of Charles Darwin, Esq., M.A., Sec. Geol., &c., on this subject.

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* On the 6th of December, 1815, Captain Kotzebue, on his voyage around the world, observed on the surface of the sea, near the Island of St. Catherine, a serpentine streak, about two fathoms broad, of a dark brown colour, which extended as far as the eye could reach. Upon examination, it was found to be occasioned by an innumerable quantity of small crabs, and the seeds of a marine plant or weed [qu. *fucus natans*, or *Gulf weed ?*] supposed to grow at the bottom of the sea.—*Kotzebue*, Vol. I., p. 113.

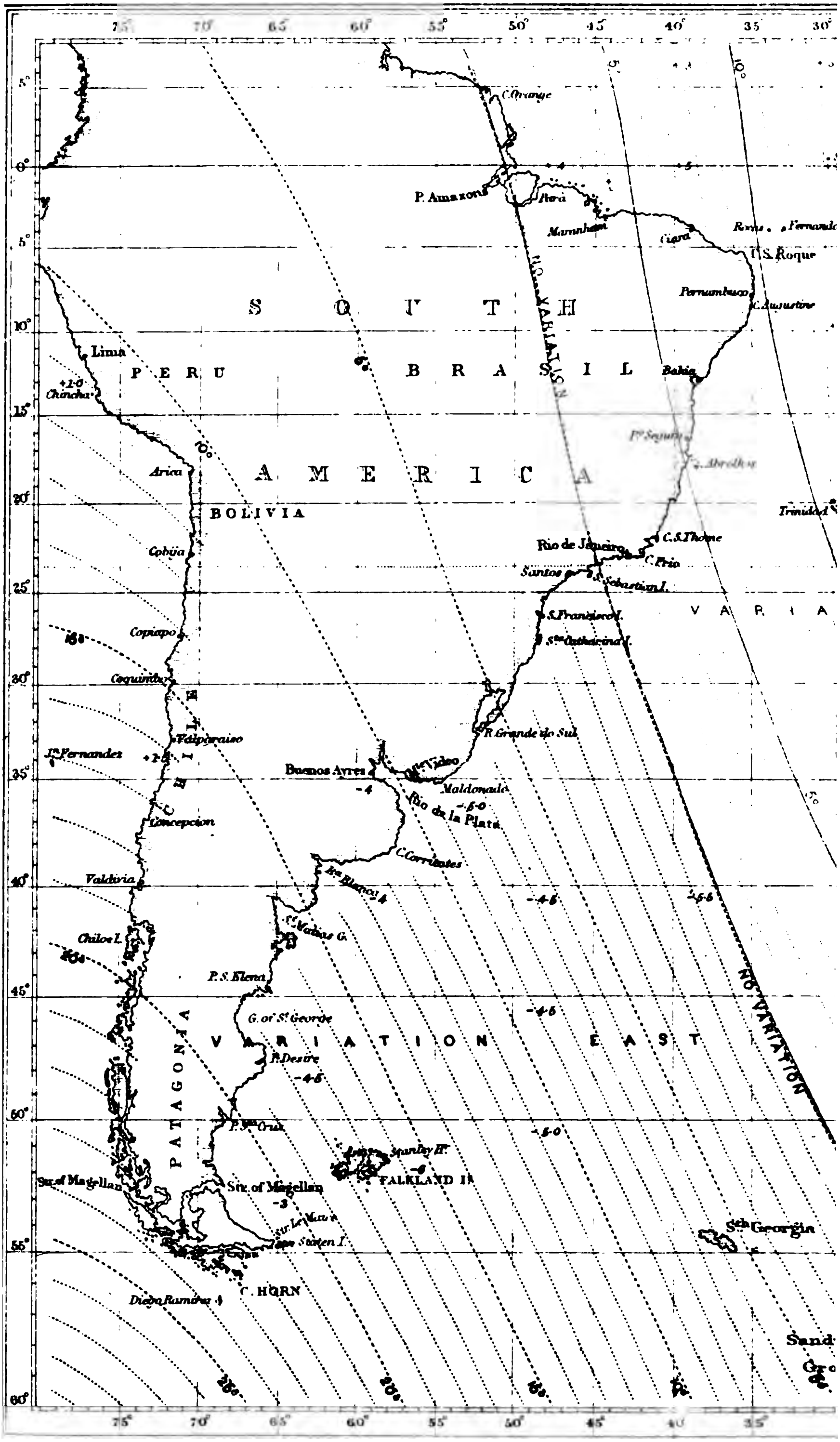
† Narrative of the Voyages of the *Adventure* and *Beagle*, 1832—1836, Vol. III.

"March 18th, 1842, we sailed from Bahia. A few days afterwards, when not far from the Abrolhos islets, my attention was called to a discoloured appearance in the sea. The whole surface of the water, as it appeared under a weak lens, seemed as if covered with pieces of chopped hay, with their ends jagged. One of the particles measured .03 of an inch in length, and .009 in breadth. Examined more carefully, each is seen to consist of from twenty to sixty cylindrical filaments, which have perfectly rounded extremities, and are divided at regular intervals by transverse septa, containing a brownish green flocculent matter. The filaments must be enveloped in some viscid fluid, for the bundles adhered together without actual contact. I do not know to what family these bodies properly belong, but they have a close resemblance in structure with the confervæ which grow in every ditch. These simple vegetables thus constituted for floating in the open air, must in certain places exist in countless numbers. The ship passed through several bands of them, one of which was about 10 yards wide, and, judging from the mud-like colour of the water, at least 2½ miles long. In almost every long voyage some account is given of these confervæ. They appear specially common in the sea near Australia. Off Cape Leeuwin, I found some very similar to those above described; they differed chiefly in the bundles being rather smaller, and being composed of fewer filaments. Capt. Cook, in his third voyage, remarks that the sailors gave to this appearance the name of sea sawdust.

"I may here mention that two days preceding our arrival at the Keeling Islands, in the Indian Ocean, I saw in many parts masses of flocculent matter, of a brownish green colour, floating on the sea. They varied in size, from half to 3 or 4 inches square; and were quite irregular in figure. In an opaque vessel they could barely be distinguished, but in a glass one they were clearly visible. Under the microscope the flocculent matter was seen to consist of two kinds of confervæ, between which I am quite ignorant whether there exists any connection. Minute cylindrical bodies, conical at each extremity, are involved in vast numbers, in a mass of fine threads. These threads have a diameter of about $\frac{2}{3000}$ of an inch; they possess an internal lining, and are divided at irregular and very wide intervals by transverse septa. Their length is so great, that I could never with certainty ascertain the form of the uninjured extremity; they are all curvilinear, and resemble in mass a handful of hair coiled up and squeezed together. In the midst of these threads, and probably connected by some viscid fluid, the other kind, or the cylindrical transparent bodies, float in great numbers. These have their two extremities terminated by cones, produced into the finest points: their diameter is tolerably constant between .006 and .008 of an inch; but their length varies considerably from .04 to .06, and even sometimes to .08. Near one extremity of the cylindrical part, a green septum, formed of granular matter, and thickest in the middle, may generally be seen. This, I believe, is the bottom of a most delicate, colourless sack, composed of a pulpy substance, which lines the exterior case, but does not extend within the extreme conical points. In some, small but perfect spheres of brown granular matter supplied the place of the septa; and I observed the curious process by which they were produced. The pulpy matter of the internal coating suddenly grouped itself into lines, some of which assumed a form radiating from a common centre; it then continued with an irregular and rapid movement to contract itself, so that, in the course of a second, the whole was united into a perfect little sphere, which occupied the position of the septum at one end of the now quite hollow case. The appearance was as if an elastic membrane—for instance, an Indian rubber ball—had been distended with air, and then burst, in which case the edges would instantly contract and shrink up towards a point. The formation of the granular sphere was hastened by any accidental injury. I may add, that frequently a pair of these bodies were attached to each other, cone beside cone, at that end where the septum occurs. When floating uninjured in the sea, the formation of the spherical gemmules perhaps only takes place, when two of the plants (or rather animal, according to Bory St. Vincent), thus become attached and married to each other. Nevertheless, I certainly witnessed this curious process in several individuals, when separate, and when there was no apparent cause of disturbance. In any case it does not seem probable, from the fixed structure of the septum, that the whole of the granular matter is transferred from one to the other body, as with the true conjugatæ.

"I will here add a few other observations connected with the discolouration of the sea from organic causes. On the coast of Chile, a few leagues North of Concepcion, the *Beagle* one day passed through great bands of muddy water; and again, a degree South of Valparaiso, the same appearance was still more extensive. Although we were nearly 50 miles from the coast, I at first attributed this circumstance to real streams of muddy water brought down by the River Maypo. Mr. Sulivan, however, having drawn up some in a glass, thought he distinguished, by the aid of a lens, moving points. The water was slightly stained as if with red dust; and after leaving it for some time quiet, a cloud collected at the bottom. With a lens, of one-fourth of an inch focal distance, small hyaline points could be seen darting about with great rapidity, and frequently exploding. Examined with a much higher power, their shape was found to be oval, and contracted by a ring round the middle, from which line curved little setæ proceeded on all sides; and these were the organs of motion. One end of the body was narrower and more pointed than the other. According to the arrangement of Bory St. Vincent, they are animalculæ, belonging to the family of Trichodes: it was, however, very difficult to examine them with care, for almost the instant motion ceased, even while crossing the field of vision, their bodies burst. Sometimes both ends burst at once, sometimes only one, and a quantity of coarse brownish granular matter was ejected, which cohered very slightly. The ring with the setæ sometimes retained its irritability for a little while after the contents of the body had been emptied, and continued a wriggling, uneven motion. The animal, an instant before bursting, expanded to half again its natural size; and the explosion took place about fifteen seconds after the rapid progressive motion had ceased: in a few cases it was preceded for a short interval by a rotatory movement on the longer axis. About two minutes after any number were isolated in a drop of water, they thus perished. The animals move with the narrow apex forwards, by the aid of their vibratory ciliæ, and generally by rapid starts. They are exceeding minute, and quite invisible to the naked eye, only covering a space equal to the square of a thousandth of an inch. Their numbers were infinite; for the smallest drop of water which I could remove contained very many. In one day we passed through through two spaces of water thus stained, one of which alone must have extended over several square miles. What incalculable numbers of these microscopical animals! The colour of the water, as seen at a distance, was like that of a river which has flowed through a red clay district; but under the vessel's side it was quite as dark as chocolate. The line, where the red and blue waters joined, was distinctly defined. The weather, for some days previously, had been calm, and the ocean abounded, to an unusual degree, with living creatures. In Ulloa's voyage an account is given of crossing, in nearly the same latitude, some discoloured water, which was mistaken for a shoal: no soundings were obtained, and I have no doubt, from the description, that this little animalcule was the cause of the alarm.

"In the sea around Tierra del Fuego, and at no great distance from the land, I have seen narrow lines of water of a bright red colour, from the number of crustacea, which somewhat resemble in form large prawns: the sealers call them whale-food. Whether whales feed on them I do not know; but terns, cormorants, and immense herds of great unwieldy seals, on some parts of the coast, derive their chief sustenance from these swimming crabs. Seamen invariably attribute the discolouration of the water to spawn; but I found this to be the case on only one occasion. At the distance of several leagues from the Archipelago of Galapagos, the ship sailed through three strips of a dark yellowish or mud-like water; these strips were some miles long, but only a few yards wide, and they were separated from the surrounding surface by a sinuous yet distinct margin. The colour was caused by little gelatinous balls, about the fifth of an inch in diameter, in which numerous spherical ovules were embedded; they were of two distinct kinds, one being of a reddish colour and of a different shape from the other. I cannot form a conjecture as to what two kinds of animals these belonged. Captain Colnett remarks, that this appearance is very common among the Galapagos Islands, and that the direction of the bands indicates that of currents; in the described case, however, the line was caused by the wind. The only other appearance which I have to notice, is a thin oily coat on the surface, which displays iridescent colours. I saw a considerable tract of the ocean thus covered on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Ciara
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C. Augustine
SOUTH
PERU
BRASIL
AMERICA
BOLIVIA
Lima
+1·0
Chincha
Bahia
P^o. Seguro
Abrolhos
Trinidad I.
Arica
Cobija
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Coquimbo
CHILE
Valparaiso
J^n. Fernandez
+1·5
Concepcion
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Chiloe I.
Rio de Janeiro
C. S. Thome
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Santos
S. Sebastian I.
S. Francisco I.
S^ta. Catharina I.
R. Grande do Sul
Monte Video
Buenos Ayres
-4
Maldonado
Rio de la Plata
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C. Corrientes
B^a. Blanca
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S^t. Matias G.
P. S. Elena
G. of S^t. George
P. Desire
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P. S^ta. Cruz
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FALKLAND IS.
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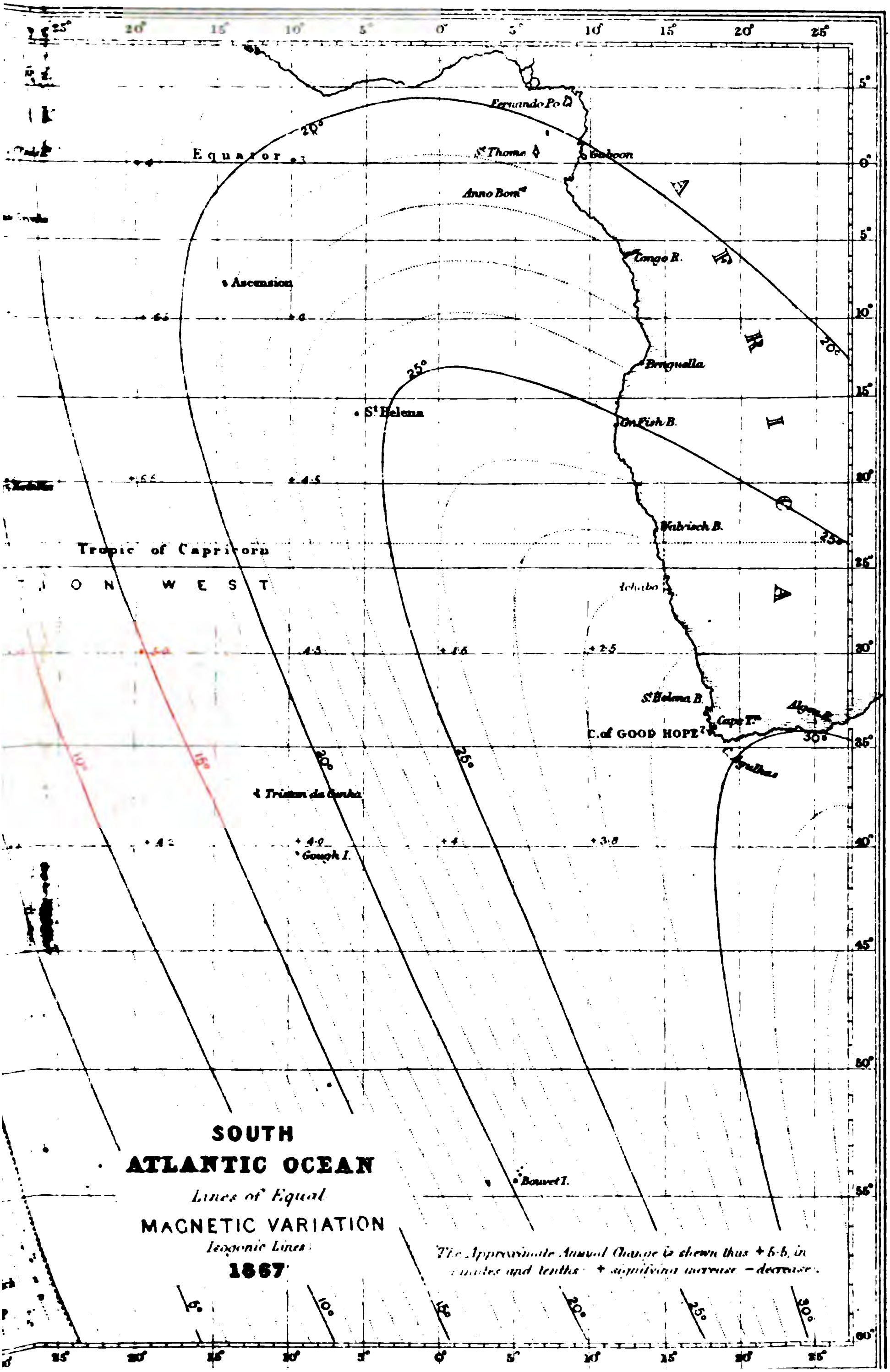


SOUTH
ATLANTIC OCEAN

Lines of Equal

MAGNETIC VARIATION

Isogonic Lines

1867

The Approximate Annual Change is shewn thus + 6·6, in minutes and tenths + signifying increase − decrease.

he coast of Brasil; the seamen attributed it to the putrefying carcase of some whale hich was probably floating at no great distance. I do not here mention the minute elatinous particles which are frequently dispersed throughout the water, for they re not sufficiently abundant to create any change of colour.

"There are two circumstances in the above accounts which appear very remarkable; rst, how do the various bodies which form the bands with defined edges keep toether? In the case of the prawn-like crabs, their movements were as coinstantaeous as in a regiment of soldiers; but this cannot happen from anything like oluntary action with the ovules, or the confervæ, nor is it probable among the insoria. Secondly, what causes the length and narrowness of the bands? The appearance so much resembles that which may be seen in every torrent, where the tream uncoils into long streaks the froth collected in the eddies, that I must attribute he effect to a similar action either of the air or sea. Under this supposition, we must elieve that the various organized bodies are produced in certain favourable places, nd are thence removed by the set of either wind or water. I confess, however, that here is very great difficulty in imagining any one spot to be the birthplace of the illions of millions of animalcula and confervæ; for whence come the germs at such oints?—the parent bodies having been distributed by the winds and waves over the mmense ocean. But on no other hypothesis can I understand their linear grouping. may add, that Scoresby remarks that green water, abounding with pelagic animals, s invariably found in a certain part of the Arctic Sea."

V.—MAGNETIC VARIATION.

(223.) Among the changes which have come over the system of navigation of late ears, none have been more important than the different relation which the compass ow bears to the ship as compared with its place in former times.

Rude instruments, unadjusted, with errors unsuspected, and under influences destructive to their accuracy, have given place to what may be, in some cases, over stimation, of this primary aid to the seaman. In its very nature the compass is imperfect and incompetent to show, at sea, the minute quantities, which are now disputed over. The consequence is, that it is made, like the topic we have before discussed, ocean currents, the scapegoat for many errors of seamanship and judgment, which a more intimate knowledge and therefore greater mistrust and induced caution would have avoided.

(224.) Our present task deals with the *geographic* distribution of magnetism, not with those local effects caused by the ship or its relations to outer circumstances, but o its position in the South Atlantic. The other points, most important in themselves, nust be discussed elsewhere.

The features of the earth's magnetism, as related to the ship, are the declination, nclination, and intensity. The dip and intensity are very important elements in the djustment of the compass in its passage through the varied magnetic condition which n over-sea voyage across the Equator, conducts a ship through, but they have but ittle influence on the directive power of the needle in the latitudes usually traversed n commercial pursuits. The *declination* or variation is one of the most important lements in navigation, and its correct estimation and application most essential to the safe conduct of a ship.

(225.) The reasons why the compass is now placed in so much higher consideration o what it was in former years are manifest. The great increase of the use of iron oth for ship building as well as in the fabric of wooden ships, and the consequent astly increased influence that the ship has upon her compass has been one chief reason why attention is so imperatively demanded. Again, since the universal use of steam, the course of a vessel in passing directly from one point to another requires to be much more accurately laid, than it was thought necessary when wooden ships only were used.

Another reason, which has arisen in the course of years, is that caused by the secular variation. The accurate government surveys, which have now been in progress for 30 or 40 years, in their earlier portions have, in many cases, remained as they were issued, and consequently this change from the variation of the compass they show has amounted to a considerable quantity, such as would endanger the safety of a vessel where they have been implicity trusted to. The survey of the St. Lawrence, as commenced by Cape Bayfield, may be instanced.

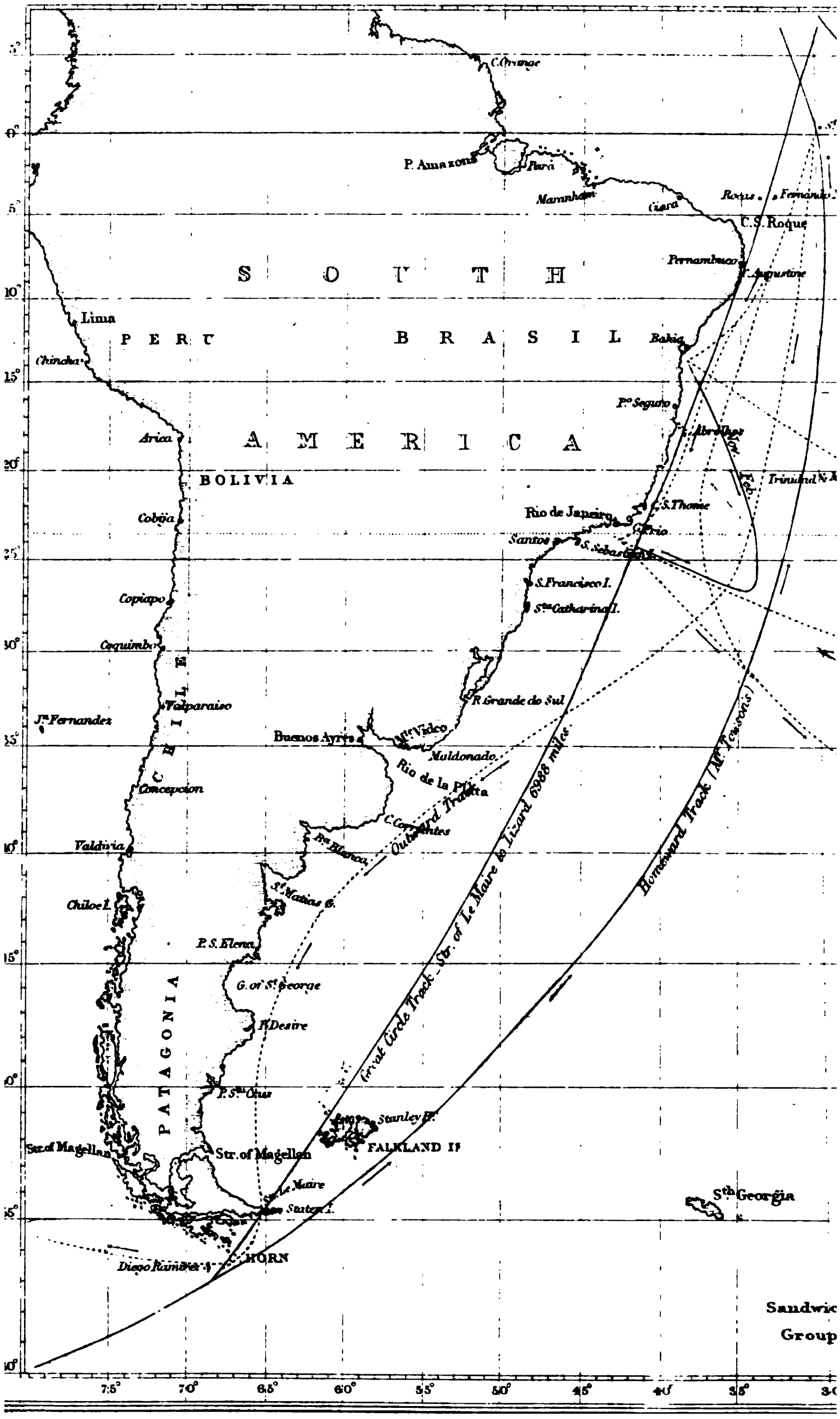
The appreciation of this change, which has thus become manifest simultaneously with the necessity for improved compasses and improved methods of using them, have placed the magnetic element in charts on a fresh basis. One most important result of this movement was the appointment by the Admiralty of the late Captain E. J. Johnson as superintendent, in 1842, of the Compass Department. The great improvement in compasses dates from this appointment, and the investigation of the difficult and varying problems of local deviation have been since pursued by eminent men, among whom may be noticed Professor Airy, Dr. Scoresby, W. Walker, Esq., R.N., Archibald Smith, Esq., and many others. These researches have been mainly directed, as before observed, to the effect the ship's iron has on her compasses. Comm. F. G. Evans, R.N., who succeeded Captain Johnson, has drawn up a far more perfect chart of the geographic distribution of the magnetic variation than we hitherto possessed; former charts having become of impaired value from the lapse of time, and from the imperfection of the observations on which they were based. It is from this chart, brought down to the period of 1866, by applying the secular change requisite to the chart of 1858, that the illustrative chart has been constructed.

(226.) The *isogonic lines*, or those upon which the variation is of the same amount, on this chart, will represent this element, generally as near as the ordinary ships' compass will show it, and will serve to draw attention to any unsuspected change in the magnetism of the ship, besides affording the sailor some information when observation cannot be had.

(227.) The *variation* of the *compass* in all parts of the coasts of the Atlantic are given with the Tables of geographic positions at the commencement of this work, and the amount of annual decrease or increase in this variation is also indicated. To these notices, therefore, the reader is referred.

It is for the open ocean that the illustrative chart and these notes are intended, and on the chart are inserted the amount of annual change in different parts, so that the approximate variation may be ascertained in future years by applying the necessary correction.

(228.) But it must not be supposed that this annual change is regular and of the same amount in each year. By the accurate observations that are now self-recorded, the connexion between these changes and apparently very remote causes have been identified. One of these, at the first glance a very singular one, is that the spots in the sun, if absent or present in large quantities, have a marked magnetic influence on the declination, thus demonstrating the source from which the magnetism of the earth is chiefly derived. As the Greenwich observations will illustrate our subject as well as any,—and this volume might be filled with interesting results on this subject,—the notices will be limited to the extracts from those observations as being sufficient to impart a notion ef the ever varying amount of the magnetic variation.


C. Orange
P. Amazons
Para
Maranham
Ciara
Roques
Fernando
C. S. Roque
Pernambuco
C. Augustine
S O U T H
Lima
PERU
BRASIL
Bahia
Chincha
P^o Seguro
Abrolhos
Arica
A M E R I C A
BOLIVIA
Trinidad
Cobija
S. Thome
Rio de Janeiro
C. Frio
Santos
S. Sebastian I.
S. Francisco I.
S^ta Catharina I.
Copiapo
Coquimbo
CHILE
R. Grande do Sul
Valparaiso
J^n Fernandez
Monte Video
Buenos Ayres
Maldonado
Rio de la Plata
Concepcion
C. Corrientes
B^a Blanca
Outward Track
Valdivia
S^t Matias G.
Chiloe I.
Great Circle Track Str. of Le Maire to Lizard 6988 miles
Homeward Track (M^r Towson's)
P. S. Elena
PATAGONIA
G. of S^t George
P. Desire
P. S^ta Cruz
Stanley H^r
FALKLAND I^s
Str. of Magellan
Str. of Magellan
Le Maire
Staten I.
S^th Georgia
C. HORN
Diego Ramirez
Sandwic
Group
0°
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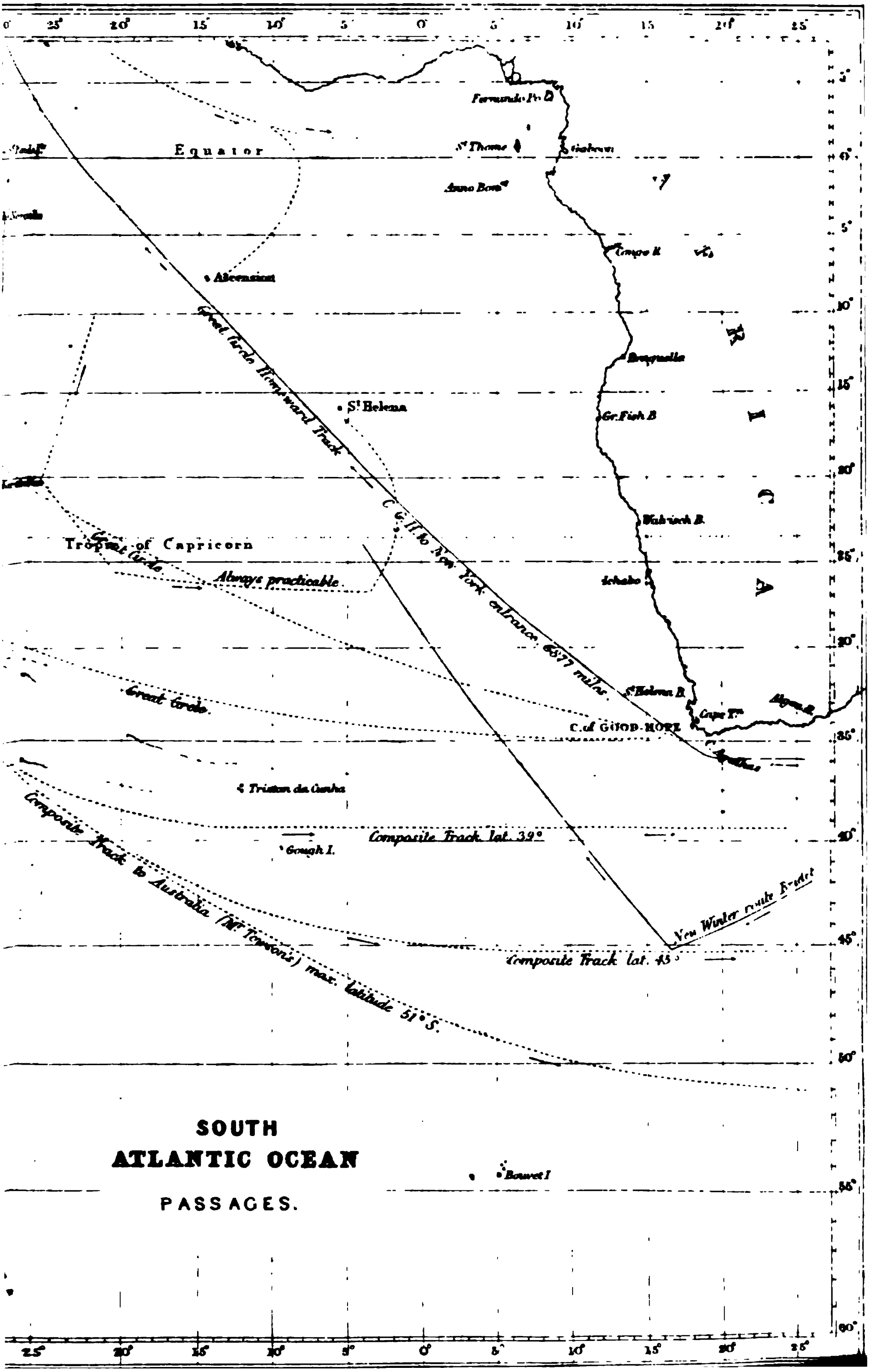

SOUTH
ATLANTIC OCEAN
PASSAGES.

	1844.	1848.	1850.	1855.	1860.	1862.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
ry	23 19 22	22 50 2	22 28 5	21 49 50	21 14 38	20 58 37
ary	23 18 43	22 49 5	22 27 28	21 48 13	21 13 2	20 58 21
	23 18 42	22 53 46	22 26 54	21 48 41	21 14 53	20 57 32
	23 18 42	22 52 27	22 25 44	21 48 44	21 15 4	20 50 43
	23 19 23	22 52 46	22 25 1	21 48 25	21 17 10	20 49 5
	23 19 8	22 53 21	22 24 47	21 40 12	21 16 1	20 52 31
	23 18 40	22 53 18	22 23 41	21 48 14	21 15 44	20 49 39
st	23 13 25	22 52 36	22 22 4	21 48 31	21 15 27	20 51 46
mber	23 13 6	22 51 31	22 25 43	21 47 9	21 12 44	20 50 33
ber	22 12 52	22 52 11	22 19 1	21 46 21	21 13 28	20 50 6
mber	22 11 50	22 51 46	22 18 27	21 45 59	21 12 49	20 50 9
mber	22 49 41	22 51 40	22 18 27	21 45 54	21 11 30	20 49 35

29.) Upon examining these columns of figures, it will be at once seen that the easing amount of westerly variation is very far from being regular, and that at times the variation is absolutely *increasing*. Thus the variation in June, 1847, was 13' 0"; in June, 1848, 22° 53' 21", an *increase* of 10' 21". The *decrease* between ary, 1846, and January, 1847, was only 1' 38"; to January, 1848, 1° 4'; to Jan. , it decreased 14° 6'; and to January, 1850, 5° 51'; the mean annual rate for four years being 5' 44". The variation in 1860 was about 21° 15', so that it had eased 2° 14' 50" in the 14 years that had elapsed since 1844, or at the rate of 8' 26" annum.

e needle also varies very considerably at times in the course of the day, the imum westerly declination is at 2 p.m. This diurnal change amounts to 7', 8', 9', ,?. This topic is so large and comprehensive, that it must be left to other works. p. sent and the illustrative chart will suffice for the present purpose.

VI.—PASSAGES.

e navigation of the South Atlantic Ocean presents but few difficulties. Its wind current systems are simple and easily understood, as will be seen by the preg pages, and it is comparatively free from those storms and hurricanes which er some portions of the North Atlantic much to be dreaded at some periods of year. It is therefore easily traversed in any direction, and it requires but few tions.

ll the difficulties and troubles are over when the Equator is reached, as has been ently noticed before. The belt of calms, monsoons, and baffling winds or dolns which separate the N.E. from the S.E. trade winds lies to the North of the ator, as has been amply dilated on in pages 37 (11), 48, &c., as well as more in the North Atlantic Memoir, 1865, pages 200—208, where the probable limits, acter, and seasons of these chief obstacles to a rapid voyage are described.

he S.E. trade wind, its force, direction, and character are described on pages -52; and the anti-trades, or westerly winds to the South of them, on pages 74—. The currents, which probably will be encountered, are described in Section III., es 87—108, and the peculiarities of the winds, seasons, and currents on the ilian and African coasts, are described in their respective places. To these the er is referred: what follows will be a few remarks on the tracks across the North ntic from the North Atlantic Memoir, as a prelude to the succeeding portions of voyages across the South Atlantic, the more particular province of this work.

1. FROM EUROPE, ETC., TO THE EQUATOR.

It is probable that there has been more discussion upon the route from the British Islands to the Equator, and on the best meridian for crossing the line, that upon any other passage. And yet the results of these inquiries as to this, the great highway of the ocean, have served to confirm in a great degree the opinions published in the early days of navigation, before any of the modern improvements and appliances had been brought to bear upon it.

The directions which were given by *M. D'Après de Mannevillette*, in his great "Neptune Orientale," published nearly a century since, might be followed now without losing much, if any, of the advantages which deep study and extensive inquiry into data lately acquired, would give to the shipmaster.

There is only one prominent point elicited, and that has come out of the investigations undertaken in the United States, by the office under Captain Maury, so often alluded to in these pages. It is, that a more *westerly* crossing of the Equator than has been advocated heretofore may be pursued advantageously during a portion of the year. As will be evident, this has arisen from looking at the voyage from the opposite side of the Atlantic to that on which almost all previous sailing directions had been composed. The configuration of the land about the equatorial portion of the Atlantic is peculiar, and causes the difficulties of a trans-equatorial voyage. The eastern point of the continent of South America, the "great bugbear" Cape San Roque, as Maury calls it, and the land about Pernambuco, lying in the strength of the S.E. trade, and the consequent strong current to leeward which runs past it, were constantly the dread of the older mariners whose ships made so much leeway, and were incapable of sailing on a wind as our modern clippers do. But from the improvements in ships and their rig and management, much that was formerly insuperable is now quite practicable, and many of the difficulties of clearing Cape San Roque have vanished upon later inquiry. It is upon this fact that Maury bases the greater portion of his arguments for a more westerly crossing of the equator than had been usually done previously.

The other difficulty, which also combines with Captain Maury's argument, is the intervening belt of calms and monsoons (which extends nearly across the ocean between the trade winds), which have a triangular form, the base lying upon the African coast, between Cape Verde and the Equator, and gradually getting narrower to the westward, and therefore by crossing them well to the westward they are traversed in a shorter distance, and their detaining effects are much less experienced. See pages 58, &c.

The great object, then, of all vessels from any port of the North Atlantic, whether on the European or American side, being to clear Cape San Roque, it follows that often the routes are the same from all quarters, and that the Equator is perhaps most advantageously crossed by all at the same point. This generally is the American argument, but, as will be seen presently, is not universally accepted yet. It is probable that as much advantage is gained by making the northern edge of the N.E. trades at a proper point, as by leaving their southern limit, but this will be discussed hereafter. All these discussions of course refer to *sailing vessels*, those entirely dependent on the peculiar meteorological condition of the localities they have to traverse.

Steam-ships, of course, are in a different category, and the *shortest* distance is therefore their best route, provided it does not lead them through any adverse influences.

Now the Great Circle route from the Lizard to Cape Horn is probably nearly the best that could be followed, even if it were not the mathematical course. It passes near to the West end of Madeira and the Cape Verde Islands, as is directed for sailing ships, and thence crosses the Equator in longitude 31¾° W. It almost touches Pernambuco and close to Rio de Janeiro towards the Strait of Le Maire, the total distance being 6,988½ miles.

Again, the Great Circle route from New York to the Cape of Good Hope is a good route out or home. It cuts the Equator in 22° W. passing through Ascension and just westward of St. Helena, the distance being 6,877 miles.

To steam-vessels there will be no difficulty in following either of these nearest routes, and they will be only modified in sailing vessels by the force of the trade winds, which will make the course through the trades more southerly than the Great Circle in going southwards.

Although a voyage round either of thé great Capes—the Cape of Good Hope or Cape Horn—involves a more extended problem than that of the passage over the South Atlantic, with which this book especially deals, yet all the difficulties and phenomena which regulate the whole voyage are encountered North of the Equator, and therefore the discussion of the voyage to the Equator includes the whole problem, and what would follow for the South Atlantic is simple and easily followed.

The GENERAL INSTRUCTIONS for making the passage from the English or the St. George's Channels to the Equator may be briefly summed up as follows:—

1. From the Lizard or the Tuskar, steer W.S.W. to gain an offing, to longitude 10° or 12° W.
2. From thence steer so as to pass to westward of Madeira.
3. Thence to the West of the Cape Verdes (or inside of them in the spring, December to April).
4. Thence to cross the Equator eastward of 30° W.

Each of these portions of the voyage are described separately in the work from which they are taken.

From NORTH AMERICAN PORTS the tracks fall into those from Europe at the Equator, so that all sailing directions southward are common to all. Captain Maury says, "I would recommend vessels, in coming out of New York and Boston, to stand off well to the eastward when the winds are fair, before attempting to make any southing. The degrees are short, and by standing as far as 60° or 50° before crossing the parallel of 40°, you have a better chance for running South across the horse latitudes. This recommendation applies to all months, but only when the winds are fair for easting."

It was about the year 1848 that Maury suggested that a great circle course from any of the northern ports of the United States to the crossing of the Equator would be an advantageous track, and the subsequent experience fully bore out his argument, and the dread of being drifted to leeward of the eastern projection of Brazil gradually became lessened. In ten years the superiority became established, although a few vessels, as Maury said, still stuck to the old route. A large number attempted to "split the difference," and to pursue a middle course between the old route and the new. Upon a discussion on the subject in the later period, 1858, the matter is summed up thus:—

From 30° N. to the line, the average distance sailed daily during the winter months is 92 miles by the old route against 134 by the new. To what is this difference owing? Are the ships that take the new route the faster? That can hardly be. They are better navigated I have no doubt, for, as a rule, the log-books show that. But still that is not sufficient to account for all this difference. In winter a ship that takes the new route from 30° to the line will go nearly as far, on the average, in one day as she could go in a day and a half by the old route This is owing, in a great measure, to the fact that the new route lies through a region of the ocean where the breezes are brisk, and brisk breezes always help to make both officers and crew brisk. This great difference of time and speed is probably owing to this circumstance more than to any other. The further from the coast of Africa, both in the North and South Atlantic, the fresher blow the trade winds.

2. CROSSING THE EQUATOR.

This topic also is discussed in the North Atlantic Memoir, pages 391, 398, and a few remarks are extracted from that work. It may be stated that Captain Maury advocates an extreme western meridian 28° 31° W. as the best to be in lat. 0° through the year. Undoubtedly much advantage has been gained over the older, and also invariable, practice of crossing on to the South Atlantic 10° further eastward; but it is still open to question whether a modification of this rigid system is not advisable. The wind and current systems change with the change of seasons; why should not the tracks of vessels crossing them also vary with these changes? Captain Maury argues that the average gain has been from 3·5 to 13·7 days in the North Atlantic voyage, or a mean monthly gain of 8·7 days out of from 36 to 44·9 days, the old average; the *best* averages being only 23 days.

But Captain H. Toynbee, of the *Gloriana*, has in some degree controverted the opinions above given, at least for the month of October, and after detailing his experience he says:—

"The conclusion I am inclined to draw from all this is, that in October when once your ship is so near the Equator as to expect the S.E. trade, and the wind sets in from S. by W. by compass, go on the port tack with the yards sharp up, and keep well full; then the wind is almost certain to turn into the S.E. trade, with beautiful weather. My experience would lead me to say that in October, when you are below 5° N., with a steady S. by W. by compass wind, you have the commencement of the S.E. trade, and should stand boldly on the port tack: but I am not quite decided as to how a ship ought to steer after passing to the westward of the Cape de Verde, though I think as we have done this year; that is, due South with a fair wind, and the tack on which you make the most southing with a foul; because the probability is, that you will have a S.W. monsoon, which will drive you well to the eastward. If there were not this probability I would have a ship in October steer to get the S.E. trade, or rather the S. by W. wind, in about 20° W., for if she does not get into the latitude of Cape St. Roque quite so soon, I think we shall be in a better position by the time she loses the S.E. trade."

On a previous page (99), are given some remarks on the equatorial currents issued by the Hydrographic Office, as derived from the observations deposited at the Meteorological Department of the Board of Trade, between 1855 and 1865. The following refers to the question of the crossing of the Equator from the same document:—

As the best meridian for crossing the Equator by outward-bound ships, still appears to be an unsettled question among navigators, and as it is connected with the subject of the equatorial currents referred to above, it may be of interest to seamen to append the following tabular statement, showing where each of the 930 ships already alluded to made their crossings;—it being observed that all these ships were bound from British ports either to or round the Cape of Good Hope, round Cape Horn, or to some port of South America, southward of Bahia, between 1855, and 1865:—

Meridians of Crossing the Equator.

		E. of 20° W.	20° to 22° W.	22° to 24° W.	24° to 26° W.	26° to 28° W.	28° to 30° W.	30° W. & Wstwrd.
January	No. of Ships	3	5	9	21	15	22	10
February	„	5	6	7	12	13	4	2
March	„	7	8	11	21	17	8	2
April	„	7	12	25	12	11	2	2
May	„	1	8	12	19	16	15	4
June	„	—	2	2	11	24	22	10
July	„	3	12	8	18	22	9	26
August	„	17	10	11	15	19	5	11
September	„	15	10	7	12	20	8	7
October	„	2	9	6	11	22	17	16
November	„	—	3	1	10	17	32	29
December	„	2	1	3	9	21	12	10
	930 Ships	62	86	108	171	218	156	129

It is impossible, without a more rigid analysis than has yet been bestowed on this question of crossing the Equator, to determine with precision the best meridian. It is certain that it must vary according to the seasons, and perhaps the months; and as will be seen by a few examples appended, the evidences of the advantages of the more easterly route contrast favourably with the extreme westerly route.

Until, however, the various conditions attending the size, class, and speed of the ships, the favouring circumstances or otherwise of veins of wind, or calms, and other local conditions are duly allowed for and include a large number of ships extending over several years, it appears reasonable to assign weight to the practical results afforded in the above tabular statement.

One fact is observable in compiling this statement, viz., that of the 930 ships, 808 passed 100 miles or more to the eastward of the Roccas, and thus to the eastward of Fernando Noronha.

Examples of the number of days occupied by *sailing* ships in reaching the Equator in different meridians and at different months of the year from among the 390 ships quoted:—

In January and February, three ships of 609, 614, and 1126 tons respectively, cross the Equator in 21°, 24¾°, and 32½° W., and are respectively 21 days from Greenock, 22 days from the Start, and 23 days from Liverpool.

In March, April, and June, four ships of 964, 898, 1041 (deeply laden), and 477 tons respectively, cross the Equator in 21½° 23¾°, 24½°, and 28°, and are respectively 21½, 26, 31, and 34 days from Deal, Plymouth, Gravesend, and Liverpool.

In July and September, three ships of 1160, 1202, and 765 tons respectively, cross the Equator in 30¾°, 32¼°, and 32½° W., and are 20½, 38, and 42 days respectively from Scilly, the Downs, and Liverpool.

In November, 1855 and 1856, two ships of 1050 and 300 tons respectively cross the Equator in 31¼° and 31° W., and are 45 and 21⅙ days in crossing the Equator from Liverpool; the ship making the longest passage leaves Liverpool with a "fair but light wind, which lasted with slight intermission to the N.E. trades, which are also light. Ship was 14 days from 6° N. to the Equator."

It is probable that this subject will be further enquired into, and some more definite conclusions arrived at than we are in a position now to pronounce upon.

3. FROM THE EQUATOR TO THE BRASILIAN PORTS, ETC.

There is no difficulty in making any of the ports after having passed through the doldrums, and having cleared Cape San Roque and the dangerous Rocas, of which a description is given presently. A general S.S.W. course will carry you onward, and when you cross the Equator to the West of 29° W., draw a line from the point of crossing to Cape St. Augustine, lat. 8° 21′ S., and aim to keep to the eastward of it, and for this purpose take advantage of all slants. You should aim generally to make easting, when easting becomes necessary after crossing the line, before crossing 7° S. (*Maury.*)

Bahia to Rio.—Captain Mouchez has given the following remarks. There is no difficulty in running down the coast from Bahia to Rio Janeiro; it is only in the months of May, June, July, and August that any contrarieties occur, and gales from the South are encountered. But it is at this season that the winds hold most to the southward, being not usually more than E.S.E. or E. by S. Advantage should be taken of the S.W. squalls, which frequently occur, to get off the land, if you should be too close in. You may either pass through the Abrolhos Channel or outside the group, according to the position from which they are approached. The greatest chance of meeting with contrary winds from the S.W. is in the parallel of Cape San Thomé, and this is most probable in June. At 80 or 100 leagues off the capes the chances of these adverse winds is not more than half of that near the land. Nevertheless Cape Frio should be closed with, because no benefit can be gained by keeping off shore thereabout. In all other seasons the wind is right for running down the coast.

Rio to Bahia.—The greatest difficulties on running up from Rio to Bahia, are encountered in November, December, January, and February, for during these months the N.E. winds blow very fresh along the coast, especially about Cape San Thomé. The wind-charts show that the trade wind has less northing in the offing than on the coast. It is therefore advisable to take the port tacks aboard, and make a stretch of 150 to 200 leagues to the E.S.E. before coming round on the starboard tack. The winds will then be found less adverse, and the northerly current much less rapid, for when the trades blow strong the current runs at 1 to 1¼ mile an hour along the coast, but this velocity is much less close inshore. November, and especially December, are the most unfavourable, and therefore it is necessary to prolong this eastern board to the utmost that may be considered necessary. In the other months of the N.E. monsoon—or October, January, and February—it is not necessary to go further East than to gain the Abrolhos on the other tack; for the wind observations show that beyond the parallel of these islets the direction of the trade wind, being from E. or E. by S., is always favourable for going to Bahia.

During the rest of the year, that is from March to October, in running up the coast keep as close as possible to the shore, not more than 10 to 20 leagues off, and do not run off to the East, unless compelled to do so by strong N.E. winds off Cape Frio or San Thomé. This frequently occurs in the S.W. monsoon, but then it only lasts two or three days, and give way to calms and quiet weather, with variable winds from S.W. to S.E. By manœuvering thus, and taking advantage of these slight shifts of wind, more frequent near the land than off it, you may make all possible way by means of the trade wind which comes from E. by N. to E. by S. The distance is also shorter, for instead of running eastward for 200 leagues to gain a point 200 leagues to North, you have only the direct distance to work, and it is also uncertain whether favourable winds will be met with outside.

Between Bahia and Cape San Thomé the variations from the land and sea breezes must not be reckoned on; they are not met with, especially in the bad seasons; the land in general is too low and too wet to affect the direction of the wind.

Routes for Steam-vessels between Bahia and Rio.—Steamers should, as a rule, follow the shortest practicable route. Between Rio and Bahia the best course is within sight of the land, but as this may cause some anxiety from the projecting points which must be doubled, a few words of advice will follow, which may serve to give confidence.

From Bahia to Rio a steam-vessel should steer South *true* up to lat. 16° S., when she will have run 180 miles; then steer S. ½ W. directly for the lighthouse on the Abrolhos, and when having made 118 miles good in this direction, should be abreast of these islets. This track will follow the coast at 8 or 9 leagues distant, as far off as it can be seen; during the day you may steer 2° or 3° to starboard, so as to make the land out better; by night keep as much to port, particularly if the easterly breeze is fresh, as their force will counteract the drift land wind. Having reached lat. 16° 30′, if there is any doubt as to your position, and the weather is clear, bear in a little to port, so as to endeavour to make out Mount Pascal to the S.W., which would be seen as a small rounded pap rising above the horizon; if this is seen, it will be 48 or 50 miles off, and you will be exactly on the meridian of the Abrolhos in lat. 17° 30′. The Abrolhos light should be seen by night, or the tower, like a ship under sail, by day; then steer so as to pass the islets at 12 miles to the West.

Beyond the islets the *true* direct course is S. 24° W., to pass 6 miles East of Cape San Thomé, in 22 or 25 fathoms, the distance 270 miles. On this track the land will not be visible until near the Rio Doce, when the breakers may be seen on the bar. The low land of Cape San Thomé perhaps will not be visible. At night keep 2° or 3° to port of this route, and keep the lead going when near to the projecting points, so as to lose no ground, or to approach too near. It should also be ascertained whether the current is running to S.S.W. or S.W. so strong as to make you overrun your reckoning.

From a point 6 miles East of Cape San Thomé in 25 fathoms, the direction and distance to Cape Frio are S. 52° W. 91 miles, it may be passed as close as you please, and may be discerned 35 or 40 miles off. By day there is no difficulty; by night it is better to keep off 3° or 4° to avoid the indraught of the Gulf of Macahe, and also to gain an earlier sight of the lighthouse, which, being on the South point of Cape Frio Isle, is masked by the East point when to northward of N. 50° E. from the light. From Cape Frio to the Sugar-loaf at Rio is 65 miles, and the whole distance to be traversed, the shortest which can be followed by a steamer between Point San Antonio and Bahia is 724 miles.

From Rio to Bahia.—Leaving Rio in a steam-vessel steer for Cape Frio, passing it close-to; but if fresh N.E. winds are encountered, it will be better to keep about 2 miles off the cape, because the sea is frequently very heavy near it at such times. Thence steer N. 52° E. to double Cape San Thomé, as before stated. If it is daylight the position may be rectified by a bearing of Mount Sao Joao de Frade de Macahe, or the small mount of Itahoca. The latter is remarkable, rising out of the marshy plain, and generally visible. The low land of Cape San Thomé should not be seen on this track, which ought to take the ship 12 miles off; should it be seen, you will have been drifted to N.W., and should haul off to the eastward; the depth should never be less than 25 fathoms. Keeping some miles to the East of the banks of San Thomé in 28 fathoms, run to N. 24° E. towards the Abrolhos, using the same means and precautions as mentioned for the reverse route.

There is an especial advantage in passing through the Abrolhos Channel, or going northward, because for 20 leagues or more the sea is much quieter than outside the reefs, which serve to shelter the passage. Beyond the Abrolhos proceed as directed for the downward track, correcting the route by sighting the land by day, or by the lead in the night.

4. FROM THE EQUATOR TO CAPE HORN.

There is but little choice in making this passage. The most direct course is almost the only one that can be taken. The land of South America on the one hand, and the S.E. trade winds on the other, leave little scope for variety, as far as the latter is encountered. In a former page it is said that the great circle which passes through the Lizard and Cape Horn cuts the equator in 31¾° W., and passes near to Pernambuco and near to Rio Janeiro, towards the Strait of Le Maire. Although this is too far West on the equator, the track of this corrected would be the best which could be followed to the South American ports and around Cape Horn.

"The sum and substance of the best sailing directions from the 'fair way' off St. Roque, round Cape Horn to the Pacific, amounts simply to this: from the parallel of St. Roque make the best of your way South, keeping a good offing from the coast; always pass inside of the Falkland Islands; and, when the wind will allow, go through the Straits of Le Maire, and hug close around the cape, aiming to get to the West as fast and as soon as possible. Occasionally ice is met with East of the Falkland Islands, and that is another reason why outward-bound vessels should prefer to go inside of these islands."

After having cleared the Rocas and the dangerous banks, now well surveyed, which lie off Cape San Roque, as described in a later part of this work, the remarks on proceeding from Bahia to Rio before given may be observed. The same reasons hold good as far as the Rio de la Plata, and hereabout the S.E. trade will have failed, and is replaced by the calm westerly winds described on pages 71—74, and 77, &c.

We give Captain Maury's remarks as they are in the edition of 1859, on this route, and they will be perused with interest:—

Vessels bound round the cape should first, after leaving Cape St. Roque, aim, if the winds will let them, to cross 25° S. in about 35° W. At any rate, they should run down the coast, keeping as far off from the land as, with a good clean rap-full, they can, without going to the East of 33° 34°.

After crossing the parallel of Tierra del Fuego, the difficulty is to get to the westward. Therefore, aim always to pass *inside* of the Falkland Islands, and, if wind and daylight serve, through the Straits of Le Maire; for it is better to make westing on the North side of their parallel of latitude, when it is practicable, and where the weather is mild, than to put it off for the stormy latitudes, South, where it is more difficult.

Captain Smyley, who has been engaged for many years in the seal fishery of the South Seas, has furnished me with some remarks and sailing directions in relation to this part of the ocean; so also have Captain Bryson, of the brig *Daniel*, and others; navigators may find these remarks useful. I therefore copy and repeat them.

Captain Bryson says, "About the parallel of 45° S. a marked change in the weather occurred, followed by a constant succession of gales. The temperature of the sea had also suddenly fallen some 6° below the temperature of the air, as indicated by the thermometer attached to the barometer in the cabin The difference of temperature between the air and the water continued with little variation until we passed the cape, except a part of the 14th, 15th, and 16th of February, when we stood far enough eastward to bring Falkland Islands in a line with Cape Horn. At those times, the temperature of the sea rose to about the same range as the air; from that circumstance, in connexion with the N.E. current, I was strongly impressed with the idea that a steady cold stream set to the northward and eastward, like the Gulf Stream on our coast, the elements being only reversed, which would account for the continual storms that seem to prevail in that region.

"That current continued more or less strong in proportion to the strength and duration of the gales; but varying more easterly as we drew up with the Horn, until we were fairly past it, and nearly up with the latitude of Cape Pillar, amounting to no less than 650 miles! Considering this great drawback in connexion with the almost constant adverse gales, many of which were so heavy that no ship could bear canvas, it seems highly important to ascertain the most desirable route, if possible, to avoid such serious dangers and delays. It was my intention to have doubled the cape close, and keep near the land all the way round. But, after making Diegos, the violence of the gale seemed to render it a matter of prudence to keep an offing; then there was difficulty in making northing without also making much easting. When we finally succeeded in again attaining the latitude of the Horn, the gales were not so furious but that we could carry close-reefed topsails. The second day after our departure from Diegos, the current had set us so far to the East, I could not believe my barometer, and supposed I might have inadvertently stopped her 10′, which I deducted, in order to make our position where I wished it to be. I continued to work time every day when an opportunity offered, and seldom missed a day, considering the dreadful weather. Arriving at Juan Fernandez, I found my chronometer perfectly correct, and have since corrected the longitude for the 10, subtracted. I mention the above to show that you may rely upon my observations upon the currents, &c., with more accuracy than is usually bestowed by merchantmen. Adverting to the winds of Cape Horn, I would state that I projected wind circles like yours on the margin of your chart of tracks for the cape. The result led me to expect S.W. and N.W. as the prevailing winds for the months of February and March; but it was our hard fate to find them from W.S.W. to W.N.W. per compass. I contemplate making the voyage round *via* China. If so, shall continue the abstract, with such remarks on the movement of the elements and natural phenomena as may come within the range of my observation."

Captain W. H. Smyley says, "There are few portions of the continent of America less known than from the Rio de la Plata to Cape Horn, and none of more importance; the whole of that portion of country, except part of Belgranna and Rio Negro, being inhabited only by Indians. It has been the custom of vessels bound to the Pacific, after passing the La Plata, to go to the eastward of the Falkland Islands; some wishing to avoid running by La Agle shoal, others fearing to get *jammed* on the coast of Patagonia. This should no longer be an excuse; for the first does not exist, and of the latter there is no danger. I have cruised for the above-mentioned shoal several times, taking a good departure from the Jasans and from New Island, in the Falklands, and crossed to Cape Virginis and back in the long summer days, seeing no signs of it. In 1842 I left East Harbour, Staten Land, with my consort in company, and steered for the shoal, keeing about eight miles apart. The weather was clear. I kept men at the mastheads, and saw nothing of it. My observations were to be relied upon; for I had on board three chronometers, which had been well proved at Cape St. John. I kept on for Rio Negro, and on my arrival again tried my chronometers, and found them correct. I am well aware that no such shoal exists. I have since then tried to find it with the schooner, but without success. The *Beagle* and *Adventure*, and Captain Sullivan, of the navy, have also hunted for this shoal without finding it.

"As for a vessel getting blown on shore on the coast of Patagonia by north-east gales, it is out of the question. I have spent twenty-two years of my life mostly from South Shetlands to the River La Plata, and once I remained six years without coming North of 41° South, and I cannot say that I ever knew, during that time, the wind to blow heavily directly on shore for twelve hours. My voyages being principally made for sealing or whaling caused me to keep close into the coast, whereby I had the best opportunities for observing the weather, currents, tides, &c.; in fact, my voyages depended partly on these, and it stood me in hand to make myself acquainted with them.

"I have always found that the sooner I got to the westward, after crossing the line, the better. I always try to make the Peninsula of St. Joseph's, between New Bay and Port Valdez. The land is high, steep clay cliffs, flat on top. Then, I endeavour to keep near enough to see the land until I get well to the South, so as to pass close by Staten Land; by doing this, I have smooth water, winds from N.W. to W.N.W., and pleasant weather; while another vessel will have the wind from W.N.W. and S.W. off the Falkland Islands, and on the South side of the islands the wind will be from S.W. to S. This I have proved by having left men on the Jasans and the Bushenes, (these being the extremes of the islands, both sealing grounds,) and requiring them to keep a journal of wind and weather. I found the wind to prevail much more from the S.W. and S.S.W., about one-third or one-half way beween Cape Horn and ——, and beyond that distance it drew more to the westward, and even to the northward of West. It was a common thing, while at anchor under Diego Ramirez, or sealing on shore, to see a vessel pass inshore of the island heading up two points higher than another vessel off shore of them; and I have often started to go in to anchor, heading well up for the place I wanted to come to at, and found, as I drew in shore, the wind gradually headed me off. When bound to Shetlands, from the Cape, or from Staten Land, (Shetland is our rendezvous, on account of getting wood there to last until our return,) we always find, after passing the latitude of 60° South, the weather much milder, fewer blows, but more fog. The, currents as well as the winds, are generally the reverse of what they are off Cape Horn. The prevailing wind at Shetland is N.E., while in the track generally taken by vessels it is S.W. The current is similar, for it seems more like a gulf-stream than a common current following the direction of the wind.

"No navigator should be afraid to approach the coast. Soundings are found far out; the water is much discoloured, as the land is neared; and we have another sign, which seldom fails in the daytime, *i.e.* the small gulls, which will always be found in 40 or 50 miles of the coast, making their presence known by the noise they make as soon as the vessel is perceived. This seldom fails to be the case.

"The navigator should not be backward in tacking as soon as he finds himself getting off shore, for the wind will often lead him along for two or three points, and then favour him for a short distance again, by which means vessels often get so far to the eastward as to lose much time. I would always recommend a ship to tack in shore, even if she could make no better than a W.N.W. course, in preference to going to the eastward; for by keeping well in, she will have smooth water, clear weather, and wind more off shore. While, on the other hand, when she nears the Falklands, she would begin to have fogs, rain, and sleet; and South of the islands the rain becomes hail-stones and snow. A short distance in these latitudes makes a great difference in wind, weather, and tides.

"For comparison, take Santa Cruz harbour, on the coast of Patagonia, latitude 50° 8′ S.; longitude 68° 21′ W.; tide in spring, 48 feet. The Jasan Islands, belonging to the Falklands, latitude 51° S.; longitude 61° 20′ W.; tide but 6 feet. Here is a great difference in 7° of longitude, about 260 true miles. This will show the extraordinary difference made in tides by a short distance, and the weather in proportion to the tides; on the one it is seldom known to rain, at the other it rains half the time. At the Straits of Magellan, in a similar way, it seldom rains at the eastern entrance, and at the western it seldom stops; but this is owing more to the mountains leading from Cape Forward along the straits, and from thence to Cape Tres Montes, or Chili."

"I think," says Captain Ebenezer H. Linnell, "the Straits of Le Maire should be passed near to Terra del Fuego shore, and continue the shore until well to the West; by so doing, I have found an eddy current to the West; this being the fifth time I have found this to be the case. Since 1845, I have been navigating these waters, mostly in the Chili trade, and I am confident that my passages have been shortened by keeping near the land. When to the West of the Straits of Magellan, I think you will eventually find that by keeping from 60 to 100 miles from the coast until you approach the 35° of latitude, then to pass near to Juan Fernandez to the S.E. trades, for the six summer months; then, for the winter months, a direct course a little to the West, you will find favourable winds. In July 21, 1851, I passed through the Straits of Le Maire; passed the equator in 115° W., in 26 days, by the western route. In October, 1852, in 27 days from the Straits of Le Maire, and passed the equator in 116° W. per ship *Buena Vista*, being a full ship."

Captain Maury continues:—

"The opinion expressed by these navigators as to the Cape Horn route, are fully confirmed by the pilot charts; and though sometimes a vessel, by going to the East of the Falkland Islands, may have good luck, fine weather, and a short passage, it should be considered as the exception, but by no means as the rule. The combined experience of all the Cape Horn navigators whose journals have been consulted during the progress of my investigations, is against the eastern, and in favour of the western, or in-shore passage, as a general rule.

"Cape Horn navigators should not forget that the prevailing winds encountered in doubling the cape are westerly winds; that the Andes, which in fact terminate only with the continent, stand up as a barrier to these winds; and consequently these winds come around the cape in violent sweeps, puffs, and gales, as they do around a bluff point of land in a harbour, or the corner of a building on shore. The strength of these sweeping winds is probably felt with more force near the cape than it is at a considerable distance off, and out of the influence of the land upon the course and velocity of the wind.

"Hence the earnest recommendation to navigators to pass through the Straits of Le Maire, if practicable, and if they can, accomplish it by daylight, for the currents are not unfrequently strong and conflicting there; to hug the cape as closely as the winds on one hand and the rocks on the other will allow, and so make westing down there where the degrees are short, as fast as, without fighting adverse winds and weather, they may do, until they cross, if bound to California, the parallel of 50° S., between the meridians of 80° and 90° West.

"But if, after getting through the straits, and before doubling the cape, a westerly gale strike them in the teeth, then, instead of stopping there off the pitch of the cape to fight against it, with the intention of holding their own until the gale abates, or the wind slants so as to let them get round, I think the chances would be altogether in their favour by sticking her away South, under the expectation that they would soon get out of the strength of the winds, which, eddy-like, come sweeping around Cape Horn, sometimes at one distance, sometimes at another, according to the direction of the gale. But even in doing this, the navigator who is desirous of making a quick passage, will not fail to take advantage of slants. He will always prefer, until he doubles the cape, the tack upon which he can make the most westing. Vessels intending to touch South Valparaiso, or any of the Intermedios, need not care to get so far West while they are South of the parallel of 50°, even when the winds are fair, as vessels that are bound further North, as to California, for example. Let these last make westing whenever they can, without making southing also. They cannot well cross the parallel of 50° S. too far West, on their way to California, provided they keep to the East of 100° or 110°.

"The pilot charts of the South Atlantic and Cape Horn, in addition to the track charts, leave but little more to be said with regard to the passages West, around Cape Horn, than may be gathered from the injunction—Study the pilot charts.

"I think that I may now congratulate navigators, especially those who are co-operating with me, and whose labours have enabled me to bring about these results, upon the present state of our knowledge with regard to the route to the 'fairway,' off St. Roque, and thence around Cape Horn.

"This route, I think I may be permitted to say, without incurring the imputation of self-praise, is as well understood as it is possible for any route across the ocean to be, that is governed and controlled by the force of winds and currents alone.

"The average of vessels under canvas from the parallel of St. Roque to 50° S. on the Cape Horn passage, is only about 100 miles a day. The intelligent seaman needs no other sailing directions here than simply—'Make the best of your way South.' Of course he will understand that this 'best way' is not to be supposed to lie so close along with the land as to bring him within the influences of the land breezes and the calms of the coast.

"Besides this injunction there is but another simple caution to add, and that is, when you arrive at the calms of Capricorn do your best to get South; for, by that course, it is easiest to clear them. As to the parallels between which, at the different seasons of the year, you may expect the calms, see the trade wind chart.

"From 50° South, East of Cape Horn, to the same parallel West, lies the rub—so it is supposed. Along this part of the route the prevailing winds, it is true, have westing in them, and are, therefore, in a great measure, head winds. How to overcome them depends on the skill of the navigator. The grand object of this work is to let the navigator know how he may expect to find the winds, which way the currents; taking it for granted that, when he knows this, his own skill and intelligence will best guide him as to the rest."

In the resumé of the passages from Cape San Roque to 50° S. in the Pacific, a large number of which are quoted and discussed by Captain Maury, who gives the following tabular results and remarks:—

RESUMÉ OF CAPE HORN CROSSINGS.

Days from	January.	Feb.	March.	April.	May.	June.
St. Roque to 50° S.	25·0	26·6	27·3	30.2	29·7	29·3
50° S. in Atlantic to 50° S. in Pacific	16·7	17·6	18·2	17·	18·8	15·5
St. Roque to 50° S. in Pacific ..	41·7	44·2	45·5	47·2	48·5	44·8

Days from	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Means.
St. Roque to 50° S.	29·5	31·8	26·9	26·2	24·3	25·7	27·7
50° S. in Atlantic to 50° S. in Pacific	18·3	17·	20·1	18·8	20·4	15·7	17·8
St. Roque to 50° S. in Pacific ..	47·8	48·8	47·	45·	44·7	41·4	45·5

From the parallel of Cape St. Roque to the parallel of 50° South, at the usual crossing place for the Cape Horn trader, is about 2.900 miles—not quite the distance from New York to Liverpool. And the most striking feature in this table is perhaps the length of the time between these parallels.

The distance from the average crossing of 50° in the Atlantic, around the Cape, to the average crossing of the same parallel in the Pacific, is nearly half the distance from the parallel of St. Roque to the Atlantic crossing of 50° South, and the time occupied around the Cape is, considering winds and sea, by no means disproportionate.

The average distance made good against the current around Cape Horn is 80 miles a day. The average distance from the parallel of St. Roque to that of 50°, through a mild climate, and with no such opposing current, is 105 miles the day. And the average distance made good by the "liners" *from* Liverpool to New York is 95 miles a day; *to* Liverpool the average made good is 135 miles.

These Cape Horn crossings are derived from the mean of nearly 400 passages taken at random, and they give us, it may be supposed, what may be finally considered as a *fair* average, for it really differs only a "dog's watch" from the average, as stated in the seventh edition of this work, from the mean of 220 passages. So it appears that the passage from England to New York under canvas, in the winter time, is nearly as difficult as the passage around the Horn.

Navigators are recommended to give these tables an attentive examination, for they are instructive. January and December are good months from St. Roque around the Horn, giving an average passage of 41·5 days. February and November give only three days longer. March and October are still worse, the passage then being aggravated by the difficulties from the parallel of 50° in the Atlantic to 50° in the Pacific. The months from April to August are worse than all, and here the difficulty lies chiefly from St. Roque to the parallel of 50°, the average of that part of the passage being about 20 per cent. longer than it is in January. In March, May, and July, and from September to November, the doubling of Cape Horn is most difficult, the monthly average being between 19 and 20 days from the parallel of 50° on one side to the same parallel on the other. The best months for doubling it are from December to April inclusive, the average being about 17 days.

On the other hand, August gives the largest average from the parallel of St. Roque to that of 50°, and November the smallest. From March to August inclusive, the monthly mean for this part of the route is 29·3 days, while for the six other months the average is 25·8 days. Thus it ceases to be any longer a matter of opinion, for actual experience has decided that, as a rule, the months of the least daylight give the longest passages for Cape St. Roque around the Horn.

It is, however, useless to go into any further discussion of this table here. Every navigator can do that for himself. It is only necessary to call his attention to the *apparently* very tedious time * generally which navigators have from the parallel of St. Roque to that of 50° S.; how nearly all vessels pursue the same route, and how those vessels that go East of the Falklands, though they reach 50° sooner, lose all they gain in getting West after clearing those islands.

Take, as an instance, the ships which did this in July. Their average time to 50° South in the Atlantic was 28, and then around the Horn 22 days; total, 50. The average of the inside ones for that month is 30 and 18 days, total 48; or a gain of 2 days by passing inside of the Falkland Islands.

REMARKS BY CAPTAIN BASIL HALL, R.N.

Captain Basil Hall, from his valuable experience, has said (in 1820) that "a considerable difference of opinion prevails as to the fittest time of the year for making a passage round Cape Horn from the eastward. There seems good reason for believing that, in winter, when the sun is to the northward of the equator, the chance of easterly winds is the greatest; and many persons are of opinion that the westerly gales are then neither so violent nor so lasting as during the months when the sun is southward of the equator. Admitting the circumstances to be as stated, there remain two very serious objections to the winter season: first, the length of the nights; and secondly, the presence of ice islands. In a tempestuous and frigid latitude the absence of daylight always augments, in a very serious degree, the difficulties of navigation, but when the formidable danger of icebergs is added, there can be little further question, I think, as to which season is preferable. All accounts seem to agree, that it is during the winter and spring months, July, August, and September, that the ice is most generally met with; and as the masses in which it floats about are sometimes only a few feet above the water, and such as cannot possibly be distinguished at night, the risk which ships run in winter months is very great. Sometimes it is met with in fields, which embarrasses ships exceedingly; and since the opening of the commerce with the shores of the Pacific has multiplied the number of vessels navigating these seas, many accidents occur every season."

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* Average distances made good per day: from St. Roque to 50° S. 105 miles; from line to 38° S. 105 miles; from 30° N. to line (new route), 111 miles: ditto (middle), 97; ditto (old), 89; from Lizard to 30° N. 110 miles; thence to line, 100 miles.

Commodore Bowles has noticed that, although the dangers and difficulties of a passage round Cape Horn into the Southern Pacific are not of the formidable nature commonly imagined, yet much severe weather may be expected, especially near the Equinoxes, when hard gales from West to S.W. prevail, and are more serious from the severity of the cold, which makes reducing sail at night difficult and dangerous.

Passing through the Strait of *Le Maire* is now very generally disused; as the short distance gained is much more than counterbalanced by the danger of entangling your ship with the land, in the event of a shift of wind, as well as the risk to which she is exposed from the rapidity of the tide. The whalers now make the Falkland Islands, and see Staten Island only, as they pass to the westward.

In describing a passage *from the Pacific Ocean* round Cape Horn and toward Rio Janeiro, in 1822, Captain Hall says, "From 49½° S. and 82° W. to 55° S. and 78° W. we had fresh N.N.E., N.N.W., and N.W. winds. Just as we were about to haul up to round the Cape on the 12th of August, the wind came from N.E. by compass, or about E.N.E. *true*, which obliged us to go as far as 57½° S. before the wind shifted to West and N.W. We passed out of sight of Cape Horn on the night of the 14th of August. From the meridian of Cape Horn to that of the Falkland Islands we retained the N.W., and latterly the S.W. winds. It then fell calm; after which we had S.E. and S.S.E. breezes, with snow showers (the first we had seen), nearly as far as lat. 40° S. In the Pacific, between 50° and 55°, we had hard breezes, with rain and a considerable sea, but not such as to prevent our scudding with ease. During all the passage of the Cape we had fine weather, with smooth water and a mild climate, that is to say, the thermometer was not below 39°. Off the Falkland Islands, with an E.S.E. wind, it fell to 35°. This temperature seemed cold to persons recently come from a residence of more than six months in one of the hottest parts of the world; but, upon the whole, the season was finer than that of the correspondent North latitude.

Remarks by Captain James Weddell, 1822—23.

Many commanders of ships who have been successful in making a passage round Cape Horn to the westward, have treated with unmerited derison the accounts given by Commodore Anson of this navigation.

I am quite satisfied, from my own experience, that the month of March might be productive of all the distresses described by the journalist. Capt. Porter, who passed the Cape in the American frigate *Essex* in March, 1814, says, "Indeed our sufferings, short as has been our passage, have been so great, that I would advise those bound into the Pacific never to attempt the passage of Cape Horn, if they can get there by any other route."

The difficulty, however, in making this passage is removed by choosing the proper season; which when attended to must at least save much time, and wear and tear of the ship. In the beginning of November the winds begin to draw from the northward, and continue to be frequent till about the middle of February, when they shift into the S.W. quarter: during these months the westerly winds are not lasting, hence the passage may be easily effected. From about the 20th of February to the middle of May the winds are generally between S.W. and N.W., and blow with great violence. During this interval no ship need expect to make a passage round the Cape that is not well equipped in every respect. From the middle of May to the end of June the winds prevail from the eastward, with fine weather. During these six weeks a vessel may round the Cape in sight of the Isles Diego Ramirez. In July, August, September, and October, the winds prevail again between S.W. and N.W., but August and September are more particularly tempestuous. In regard to the route which ships should take to round the Cape, much depends on the season of the year, as relates to the force of the prevailing westerly winds. I prefer, at all times, passing to the westward of the Falkland Islands; and, in the summer season, to pass through the Strait of Le Maire, as it saves 50 or 60 miles of westing, and can be attended with no risk if you have sufficient daylight to see to run back through the Strait, in the event of being caught with a southerly gale at the southern entrance.

From my having been engaged five years in navigating these seas, and having performed a passage of 26° of longitude direct to the westward about the parallel of Cape Horn during the stormy month of April, I am fully acquainted with the perils and inconveniences of this navigation, and can offer my experience with the confident expectation of its being found useful.

PASSAGE OF THE JANE AND BEAUFOY, UNDER CAPTAIN WEDDELL, 1820.

On the 23rd of October, 1822, in the latitude of 8° N., the wind became light and variable, and so continued to 5° N., when the S.E. trade was found. On the 7th of November crossed the equator under the meridian of 30°, and the trade wind being far southerly, the *Jane* passed Cape St. Augustin within the distance of 100 miles.

As far as the latitude of 24° S. the wind frequently blew from N.W. to N.N.E. in heavy squalls, with thunder and heavy rain.

At this season, says Captain Weddell, the route we took may be recommended for a quick passage; but for the health of a crew entering upon a long voyage the coasting passage is highly injurious. I had one man at the point of death by an attack of *tetanus*, brought on by exposure to heavy rains.

The *Jane* and *Beaufoy* continued standing to the southward until they reached lat. 40° S., when they stood in to the westward for the coast of Patagonia.

At 8^h a.m. of the 3rd of January, 1823, eastward of the Falkland Islands, the wind shifted suddenly from W.N.W. to South, and in less than half an hour the *Jane* was brought to, under a close-reefed main-topsail. The gale continued with great violence, and with a most irregular sea, till the evening of the 4th, when it moderated. The temperature of the elements during the gale was, air, 39½°, and water, 49°. This was surprisingly low for midsummer, and the latitude of 53°; but when we consider that a South wind blows over the frozen land of South Shetland, the temperature of the air must, of consequence, be much reduced in the neighbourhood of Cape Horn.

On the 6th, in the morning, the wind again freshened at S. by E. to a gale, with a high and irregular sea, which in the afternoon stove two boats, washed away part of the bulwarks, and carried several things off the deck. This distressing sea was apparently produced by a tide or current, as the vessels were now not more than 100 miles S.E. of the Falkland Islands. At midnight the weather moderated suddenly, until there was scarcely wind sufficient to keep the ship steady. This was succeeded, on the next day, by fine weather.

The wind continued blowing moderately from S. by E. to S.S.W., with passing snow squalls, and on the 10th, in lat. 58°, five ice islands were seen. On the 11th, at noon, in lat. 59° 37′, long. 46° 1′, the temperature of the air was 33°, and that of the water 33°. Many ice islands in sight accounted for the low temperature of the latter.

At daylight in the morning of the 12th some pigeons were seen, and at 6h a.m. the eastern end of Powell's Group, or South Orkney, then bearing W. by S. about 11 leagues. All possible sail was made, in order to get under the land, but the wind soon became light and left the vessels almost at the mercy of a heavy swell, in the midst of ice islands, which rendered the navigation dangerous. At 8h one of the Eastern Islands (*Saddle Island*) bore S. 10° W., distant about 11 leagues.

During the 13th the wind was light and from the N.N.W., which in this region generally brings fog: but it shifted to S.E. with clear weather. Temperature of the air, 34°; water, 33°.

On the 27th of January, at noon, Capt. Weddell had reached the latitude of 64° 58′, longitude 39° 40½′. Variation of the compass, by azimuth, 16° 37′ E. Temperature of the air, in the shade, 37°, of the water, 34°. and weather much more settled than in the lower latitudes of 60° and 61°.

After standing to the northward, with the wind between S.E. and S.W., at noon, on the 29th of January, the latitude was 61° 18′, and longitude 40° 32′. Temperature of the air 34°, of the water the same, among numerous ice islands.

February 1st, at noon, lat. 58° 50′, long, 38° 51′. On the 2nd, a.m. the wind freshened W.S.W. to a gale. Snow squalls frequent, and many ice islands. Running East, between 60° and 61°, flocks of birds, common in these latitudes, and many finned and hump-backed whales were seen, with innumerable penguins, having for their resting-place some ice island. By the evening of the 4th the *Jane* was within 100 miles of Sandwich Land, and it therefore appeared that no intervening land could exist.

NAUTICAL REMARKS UPON THE PASSAGE TO AND ROUND CAPE HORN, BY CAPTAIN P. P. KING, R.N.*

Ships bound from the Atlantic to any of the ports in the Pacific will find it advantageous to keep within 100 miles of the coast of Eastern Patagonia, as well to avoid the heavy sea that is raised by the westerly gales, which prevail to the eastward, and increase in strength according to the distance from the land, as to profit by the variableness of the wind when it is in the western board. Near the coast, from April to September, when the sun has a North declination, the winds prevail more from the W.N.W. to N.N.W. than from any other quarter. Easterly gales are of very rare occurrence; but even when they do blow, the direction being obliquely upon the coast, I do not consider it at all hazardous to keep the land on board. In the opposite season, when the sun has South declination, the winds will incline southward of West, and frequently blow hard, but, as the coast is a weather shore, the sea goes down immediately after the gale. In this season, although the winds are generally against a ship's making quick progress, yet as they seldom remain fixed in one point, and frequently shift backward and forward six or eight points in as many hours, advantage may be taken of the change, so as to keep close in with the coast.

Having once made the land, which should be done to the southward of Cape Blanco, it will be beneficial to keep it topping on the horizon, until the entrance of the Strait of Magalhaens be passed.

With respect to this part of the voyage, whether to pass through Strait Le Maire or round Staten Island, much difference of opinion exists. Prudence, I think, suggests the latter; yet I should very reluctantly give up the opportunity that might offer of clearing the Strait, and therefore of being so much the more to the windward. With a southerly wind it would not be advisable to attempt the Strait; for, with a weather tide, the sea runs very cross and deep, and might severely injure and endanger a small vessel, and to a large one do much damage. In calm weather it would be still more imprudent (unless the western side of the Strait can be reached, where a ship might anchor), on account of the tides setting over to the Staten Island side, where, if it becomes advisable to anchor, it would necessarily be deep water and close to the land. With a northerly wind the route seems not only practicable, but highly advantageous, and it would require some resolution to give up the opportunity so invitingly offered. I doubt whether northerly winds, unless they are very strong, blow through the Strait; if not, a ship is drifted over to the eastern shores, where, from the force of the tides, she must be quite unmanageable.

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* Voyages of the *Adventure* and *Beagle*, Vol. I. p. 463.

Captain FitzRoy seems to think there is neither difficulty nor risk in passing the Strait. The only danger that does exist, and that may be an imaginary one, is the failure of the wind. Ships passing through it from the South are not so liable to the failure of the south-westerly wind, unless it be light, and then a breeze will probably be found from N.W., at the northern end of the Strait. The anchorage in Good Success Bay, however, is at hand, should the wind or tide fail.

In passing to the leeward of Staten Island, the tide race, which extends to some distance off Cape St. John, at the N.E. end of the island, must be avoided; otherwise there exist no dangers.

The anchorage under New Year Islands, although it is a wild one, the bottom bad, and the tide very strong, yet offers good shelter from south-west winds, and might be occupied with advantage during the existence of a gale from that quarter, which is so unfavourable for ships bound round the Horn.

After passing Staten Island, if the wind be westerly, the ship should be kept upon the starboard tack, unless it veer to the southward of S.S.W., until she reaches the latitude of 66° South, and then upon that tack on which most westing may be made. In this parallel, however, the wind is thought to prevail more from the eastward than from any other quarter. Never having passed round Cape Horn in the summer season, I may not perhaps be justified in opposing my opinion to that of others, who having tried both seasons, give the preference to the summer months. The average of long days is certainly very great, but, from my experience of the winds and weather during these opposite seasons at Port Famine, I preferred the winter passage, and in our subsequent experience of it found no reason to alter my opinion. Easterly and northerly winds prevail in the winter off the Cape, whilst southerly and westerly winds are constant during the summer months; and not only are the winds more favourable in the winter, but they are moderate in comparison to the fury of the summer gales.

Having passed the meridian of Cape Pillar, it will yet be advisable to take every opportunity of making westing in preference to northing, until the meridian of 82° or 84° be reached, which will enable a ship to steer through the north-westerly winds that prevail between the parallels of 50° and 54°.

Being to the North of Staten Island for three days preceding full moon, which occurred on the 3rd of April (1829), we had very foggy weather, with light winds from the eastward and northward, causing a fall of the mercury from 29·90 to 29·56. On the day of full moon the column rose, and we had a beautiful morning, during which the high mountains of Staten Island were quite unclouded, as were also those of Tierra del Fuego. At noon, however, a fresh gale from the S.W. set in, and enveloped the land with a dense mist. No sooner had the wind changed than the mercury rose to 29·95, but fell again the next morning; and with the descent the wind veered round to N.W., and blew strongly with thick cloudy weather and rain, which continued until the following noon, when the wind veered to S.W., the barometer, at 29·54, having slightly risen; but after the change it fell, and continued to descend gradually until midnight, when we had a fresh gale from W.S.W. When this wind set in, the mercury rose, and continued to rise, as the wind veered, without decreasing in strength, to S S.W., until it reached 29·95, when it fell again, and the weather moderated, but without any change of wind. During the descent of the mercury the sky was dull and overcast, with squalls of wind and rain, but on shore it seemed to be very fine sunshiny weather.

The column now fell to 29·23, and during its descent the weather remained the same, dull and showery; but as soon as the mercury became stationary, a fresh breeze set in from the southward, with fine weather.

After this, to new moon, the weather was very unsettled, the wind veering between South and W.S.W.; the barometer rising as it veered to the former, and falling as it became more westerly, but on no occasion did it precede the change. The mercury stands lowest with N.W. winds, and highest with S.E.

With the wind at N.W. or northerly the mercury is low; if it falls to 29 inches or 29·80, a S.W. gale may be expected, but it will not commence until the column has ceased to descend. It frequently however falls without being followed by this change. in the month of June, at Port Famine, the barometer fell to 28·17, and afterwards gradually rose to 30·5, which was followed by cold weather, in which the thermometer stood at 12°.

The difficulties which present themselves to navigators in passing round Cape Horn, as well from adverse winds as the severe gales and heavy sea to which they are exposed, are so great that the Strait of Magalhaens has naturally been looked to as a route by which they may be avoided. Hitherto no chart has existed in which much confidence could be placed; but by the present survey the navigation through it, independent of wind and weather, has been rendered much easier, since a correct delineation of its shores, and plans of the anchorages, have been made; and sufficient descriptions of them have been given to assure the navigator of his place, and furnish him with advice as to his proceedings. The local difficulties, therefore, have been removed; but there remain much more serious ones, which I should not recommend a large, or even any but a very active and fast sailing square-rigged vessel to encounter unless detention be not an object of importance.

Further remarks and instructions for the passage around Cape Horn, and for the Strait of Magellan, are given in our DIRECTORY for the SOUTH PACIFIC OCEAN, 1863, pages 770—790, to which the reader is referred.

4. PASSAGE TO THE ISLAND OF ASCENSION.

"In consequence of the long passages that transports and other ships generally make between England and this island (owing principally to an imperfect knowledge of the strength, limits, and direction of the trade winds and currents), I am induced to suggest that a track may be pointed out to the masters and agents of transports, on their quitting England for Ascension, in order that so much delay and inconvenience to the service may be avoided.

"An opinion prevails that in going from England to Ascension a ship should, after losing the N.E. trade wind, go either the eastern or western passage; that is to say, either along the African or American coast. By going on either of these tracks, the time and distance will be lengthened, as these passages have generally occupied from ten to seventeen weeks. The *Salacia*, chartered ship, arrived here in one hundred and three days from the Downs; sixty-one days being employed between the equator and Ascension.

"Let a ship from England make the best of her way into the N.E. trade wind, and having gained it, pass well to the westward of the Cape Verde Islands, to avoid calms, and shape a course for long. 18° or 19° W. on the equator; and so soon as she loses the N.E. trade wind, let every advantage be taken of making southing, without going further West than 18° or 19° of West longitude. Being near the skirts of the S.E. trade wind, the wind will be found to blow from S. by W. to S.W. by S.; let her then stand on the starboard tack to make her easting in a track where there is smooth water and but little current, and cross the equator in about 9° W., whence she will fetch Ascension, although she may not lay up for the island at first; for it is a general law within the limits of the trade winds, that their direction diverges, as from a centre of focal attraction, toward the coast of Africa as well as of America;

and consequently, a ship being on a wind will come up, or lay higher, the further she proceeds."

On referring to the chart the track, as above described, will be seen; and the reasons will be clear, from the direction and set of the winds and currents, as described.

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5. PASSAGES TO AND FROM ST HELENA.

As St. Helena lies within the region and strength of the S.E. trade wind, it is to be reached in ships from the northward by a circuitous route only, either eastward or westward of the island. The *Western Route*, which is always practicable, is nearly through the mid-ocean between St. Helena and the Brasilian coast, or rather toward the latter; thence south-eastward to the parallel of 23°, or thereabout, and again north-eastward and northward, so as to reach, with the advantage of both wind and current, the windward or eastern side of the island. The *Eastern Route* is, at times, the best; and it is to be recollected that ships proceeding this way, in the proper season, will be materially assisted by the *Guinea Current* to the northward of the Line, as well as by the *Equatorial Current*, flowing to the southward of it, in a succeeding part of their route. Here the information on the Currents by Col. Sabine, already given in pp. 102, &c., may be usefully applied, as well as that given by Mr. Finlaison, in the Directions for the African Coast, &c., hereafter.

Captain Horsburgh has said that, "By various examples of ships that have gone by the eastern and western routes to St. Helena, combined with other information, it appears that the eastern route may be adopted in November, December, January, February, and March. If a ship bound to St. Helena cross the equator in any of these months, and find the winds incline from south-westward, by standing to the S.E. across the Gulf of Guinea, close on a wind, and afterwards tacking as it veers to the East or West of South, she will most probably reach St. Helena in less time than if she had proceeded by the western route. From the time of losing the N.E. trade, forty or forty-four days to St. Helena may be considered a medium passage by the eastern route in these months, although it has been made in thirty-one days.

"From the southern limit of the N.E. trade, the passage by the western route is seldom accomplished in less than forty days. By this route forty-three days seem about the medium passage; and during any month of the year it may be made in this time from the situation above mentioned. The *Arniston* once made it in thirty-six days, in May, &c., but she did not proceed more to the South than to 25° of South latitude; and the *Ceres* once made it in twenty-one days from the equator, not going beyond 22° 15′ S. When the sun has great northern declination, the eastern route seems precarious; the western seems most certain at all times. A ship that sails indifferently, when close-hauled or in light winds, should not attempt the eastern route in this season; but one that glides fast through the water in faint breezes, and holds a good wind, may probably proceed by the eastern route in any season with safety. It has been the practice with ships going the western route to run far South, sometimes to latitude 32° and 33°; but this can seldom be requisite, and it lengthens the passage. The ships which have not proceeded so far South have generally made the best passages to St. Helena.

"Before the use of chronometers and lunar observations, navigators were directed, in running for St. Helena, to fall into its parallel 60 or 60 leagues eastward of it, to lie by in the night, and steer West in the day till they made the land; this practice is no longer requisite, for most of the East India ships, homeward bound, now steer a direct course from the Cape to St. Helena, and make the island by day or night; as they generally know the longitude within a few miles of the truth, there can be little danger of missing it, although this is barely possible, the body and leeward part of the island being frequently enveloped in fog clouds, particularly in the night. Should a ship in such case fall a little to leeward, she will seldom find any difficulty in working up to the anchorage, unless she sail indifferently upon a wind, for the current seldom runs *strong* to leeward near this island. This, however, may happen when the trade blows strong with squalls for a few days, which is sometimes experienced about the full and change of the moon; but this lee current is generally of short duration. In time of war, when any of the enemy's cruisers visit St. Helena, they keep to the eastward and south-eastward of it, at the distance of 15, 20, and 25 leagues. Single ships, which sail well, would avoid these cruisers were they to make the island bearing from N.N.E. to East and S.E., and afterwards make short tacks under the lee of it till they reach the anchorage. I have seen store-ships from England make the island bearing E.S.E. directly to windward of them, at the distance of 15 to 18 leagues; they sailed indifferently, but reached the anchorage the third day after making the island."

THE PASSAGE FROM ASCENSION AND ST. HELENA TO THE COAST OF AFRICA.

In proceeding eastward from these islands, it has been recommended, first, to bear to the southward, and then make the easting; but this, perhaps, is not necessary, and a more direct course is practicable. On this track the following observations by Commander H. J. Matson, will be interesting:—

"The compass direction of the winds I have scarcely ever found to vary in sixteen passages that I have made between the coast and the islands. It is easy to make the passage direct from the islands to the coast on the starboard tack; but until I made the passage from Ascension to the Congo, in February, 1840, it was the invariable practice of H.M. vessels to stand to the southward from Ascension until they could weather St. Helena, a dead beat of 700 or 800 miles. A stranger would certainly consider the latter to be the preferable route, for he would not believe it possible to reach Benguela (appearing to him 1,600 miles dead to windward) by keeping on the starboard tack; and the knowledge that the wind generally blows up the coast from the southward, with a lee current, would cause him to be more afraid of approaching the coast, and having to beat against it. Two precautions are however requisite, viz., not to go to the northward of 3° or 4° S., and not to bring your port to bear to the southward of S. 35° E. (true): an occasional short tack, as the wind veers a little may therefore be necessary; but the whole passage may sometimes be made with a flowing sheet.

"Horsburgh and others recommend vessels, even when bound from St. Helena to Benguela, to stand to the southward, and run their longitude down with the westerly winds; whereby the passage is more than doubled. This must have been owing to a want of knowledge of the prevailing winds between the islands and the coast, which, as before stated, vary very little in their direction 100 miles off shore."*

6.—EUROPE, ETC., TO THE GULF OF GUINEA AND WEST AFRICA.

The routes comprised under this head are more complicated and difficult than any other in the South Atlantic, and are indeed the only examples of adverse sailing, nearly throughout the year. Although the distance between the Ports of Europe and Angola, or Benguella, are not greater than to Rio, the length of route to be traversed and the time occupied are very much greater. This is manifest and well known, when it is considered that the direct track crosses the belt of calms or doldrums against the African coast, described on pages 58—67, in its greatest breadth, and that after these are past the wind and current are in dead opposition to a direct voyage. The case is somewhat different when the Gold Coast is the destination. In the ensuing remarks upon this topic we take much from the observations of Lieut. Brito de Capello, whose deductions on the winds and currents of this part have been before given, and which must be considered in connection with them.

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* "Nautical Magazine," February, 1844, p. 105.

There are two routes from Europe to the ports of West Africa. The first, or *Southern Route*, crosses the S.E. Trades with the port tacks on board until they are lost in 25° to 30° S., then running down the easting on the starboard tack into the belt of S. and S.S.W. winds which are found on the coast of Africa, by means of which the destination can be reached from the *southward.*

By the second route, the *northern route*, the zone of African calms is crossed nearly in its greatest breadth, until the S.W. winds of the Gulf of Guinea are reached, it is then continued along that coast, and the port is reached from the *northward.* Although this second route is not half the distance of the first, the time occupied in it is very far from being so disproportionate, and it is frequently or generally the case that the southern route is the quickest to the southern ports.

IN TAKING THE SOUTHERN ROUTE the directions for crossing the equator, heretofore given, are strictly applicable, the sole object being to gain the S.E. trades in the shortest possible time. When once within their influence, the best course must be laid to bear to the eastward in crossing them, and on arriving at their southern limit the ship may not be farther E. than the meridian on which the Equator was crossed, but this is of less moment than if a point 5° or 6° farther eastward were attempted to be reached, on that parallel, for this only represents about two days sailing, while 10, 15, or even more days may be lost in attempting to cross the equatorial calms farther to the eastward, as has been before argued.

Having attained the variable winds on the tropic, whose limits shift with the season, the best of the way must be made to get to the eastward by their aid, and by means of the westerly anti-trades to the South of them. These have been described in the preceding part of this work. In running to the eastward, on a parallel South of the trade winds in the western part of the ocean, it will be found, as the African set is approached, that the trade and anti-trade winds have a more and more northerly tendency. (See sect. 67, p. 51, and sect. 94 to 98, pp. 59 to 61 *ante.*) The South African current will also be generally found setting to the northward, as described on page 88 *ante.*

According to the sailing power of the ship, and the force and direction of the wind encountered, the course may be altered from easterly to northerly, when it is quite certain that the destination may be reached by means of this northerly wind and current. Although this may appear to be a very circuitous route, yet the comparative certainty that the voyage may be performed within a specified time, more than compensates for the uncertainty that must always be felt as to getting across the calm belt on the equator at its greatest breadth.

This belt of calms increases in extent to the eastward of the meridian of 30°, varying with the seasons; its maximum breadth being generally in July and August.

On leaving the calm zone on the equator, and reaching the S.E. trades, they are frequently found to be very much to the South, so that it is difficult at times to make better than a S.W. by W. *true* course; and as you will have to bear up against a strong westerly current, it is probable that by the time you gain their southern limit you will be very little to the East of the meridian on which you crossed the equator.

The NORTHERN ROUTE demands more consideration, and will, perhaps, be best understood by referring to the diagrams of the winds, described on pages 58, *et seq.*

If the passage is attempted at the period when the N.E. trade wind is at its southern extent, it will be carried as far as 5° or 6° N., and all the rest of the voyage may be carried on a bow line. When the S.W. monsoon has set in North of the equator, it must be made very much closer to the wind, for the monsoon is not generally so favourable as to let you double Cape Palmas, if the wind is not hugged sufficiently early. From Cape Palmas to the Angola Coast the wind is variable in its strength at all seasons, but it does not shift its direction much.

If the wind preserved an undeviating direction as far as the Angola coast, and there were no currents to be crossed, it is certain that the number and length of the different tacks taken would be a matter of little consequence. But as the wind, as before shown (see pages 58—61), follows different curved directions on either side of a central line, which runs diagonally from E.S.E. to W.N.W., on the land side, or to East of this line, they have a tendency more and more to the N.E., or blow from S.W. To the westward of this line of separation, on the other hand, they blow toward the N.W. or from S.E., being the regular S.E. trade wind. These two circumstances allow a good route to be laid with the starboard tacks on board, and which tack should not be abandoned except at the last extremity, for on this the ship will find the wind become more and more favourable as she advances; on the others, or port tack, they will become more adverse. Besides this, when the calm belt is crossed, the currents will also favour the eastern tack, not merely for taking advantage of the Guinea Current (page 97), but to avoid the westerly equatorial current to the southward. Crossing the Gulf of Guinea in this manner, the coast of Africa, South of Cape Lopez, may be gained, and it is only needful to beat up in shore to gain port, for although the winds in the offing are not strong, generally lighter than near the land, yet advantage can be taken of the alternating land and sea breeze.

These are the general rules to observe, or otherwise the voyage may be unnecessarily lengthened, but they may be somewhat modified, according to the change of seasons.

The period of the monsoon, July, August, and September, is the best for the Northern Passage for the winds, from 10° or 12° N., are generally fresh from S.W., and continue so throughout the Gulf. At this season it is well to cross the parallel of 14° N., in about long. 27° W., or even farther West, in order to clear Cape Palmas easily, as the current sets with considerable strength towards the land, or from the westward. In July the N.E. trade will probably be lost in 12° or 13° N. on that meridian, and then variable winds from N.W. to S.W. will be found. In August and September the N.E. trade is lost in 15° to 14° N., and in lat. 13° N., long. 28° W., the S.W. monsoon becomes much weaker, but it is necessary to keep to the westward to avoid being horsed by the Guinea Current; but when near Cape Palmas the wind will perhaps be more astern, and the N.E. and E.N.E. tendency of the current may be overcome; but perhaps you will not be able to get across the equator West of the meridian of Greenwich. Eastward of this the wind tacks progressively, and keeping on the same tack you can generally get to 4° or 5° S., and from this you can work down in sight of land.

In the six months from November to April, the S.W. monsoon does not exist, and the routes to be followed are nearly the same in all, being only modified by secondary considerations; but during November and December the greatest delays and difficulties will be encountered in taking the northern route. At this time the triangular space of calms, abutting on the African coast, is at its greatest extent, and a ship must go as far as 28½° to cross it with any advantage, and then it will be a long beat up against light winds and dead calms, and the S.E. trades on their northern edge are very feeble. It is therefore scarcely advisable to attempt the northern route in these months, and certainly not unless the vessel is a good sailer, and in good trim.

From January to April the southern limit of the N.E. trades and the calms remain about the same, but are more readily crossed as the season advances. From the parallel of 14° N. to Cape Palmas there is no reason why you should go so far to the westward, and if you can gain the parallel of 2° 30′ N. by a few boards to the South of Cape Palmas, it will be best. Storms are more frequent, and will allow the ship to run down the latitude with greater certainty than in the earlier part of the season.

In May and June the monsoon begins to be felt near the land, as far as 6° or 7° N., but it is better to run to the westward, and gain 9° N. between longitudes 22° and 24° W., when you may reckon on losing the N.E. trades, or rather the winds from the N.W., and cross the calms on a S.E. course, and by the time you gain the parallel of 6° N. you will encounter variable breezes from the S.W.

In October the monsoon is failing fast, and in the beginning of the month the course to be taken is similar to that in June. Having reached the monsoon run with it to Cape Palmas, which can certainly be doubled on one tack. The route thence to the East is more easy than in June, as the winds are stronger and more favourable.

This very brief resumé of the routes described by Lieutenant Brito de Capello to the Guinea Ports, a very troublesome navigation, will be better understood by a reference to the diagrams before alluded to.

Return Voyage from Western Africa.—Precisely as the outer voyage is difficult is the homeward one simple, the contrary winds and currents in the one case are useful aids in the other.

The simple rule is, in general, on leaving any part on the Angola coast, to make direct for the equator West of 24° W., so as to cross the doldrums in their narrowest part.

From December to April, when the calms are nearest to the line, cross it in 25° or 26° W., so as to cross the former between 27° and 28° in a N.N.W. direction. In May, June, October, and November, cross the equator in 24° W. In July, August, and September, the Gulf of Guinea must be crossed in the strength of the S.S.W. wind, and so must the monsoon North of the equator, by keeping closer to Cape Palmas. At this season it seems better to cross the equator in 16° or 18° West, then to run to N.W. by W. across the S.W. monsoon, with the wind free, after which the calms will be entered in about 30° or 31° West between 11° and 15° N.; beyond this latter parallel the regular N.E. trade will be encountered, at first weak and irregular, but afterwards more settled.

7.—RETURNING FROM BRASIL TO EUROPE.

As the land breezes of Brasil are nearly the same along the whole of the coast, and during the greater part of the year, the day and hour of departure may be always fixed. It has been noticed that these breezes rise during the night, and are generally very fresh during the early part of the day; as they continue for nine or ten hours, you have consequently every advantage for preparation, and for standing off to a distance from the coast, free from all local obstacles.

The Baron Roussin has treated rather copiously on the routes to be adopted in sailing from the different ports; but his rules appear to be such as will naturally suggest themselves to the mind of a seaman, on the consideration of the prevalent winds, currents, &c.

The strength of N.E. winds often force vessels when bound from ports *South of Cape Frio,* on their return to Europe, to keep close on the port tack for 12 or 15 days, and descend to the S.E. or S.S.E. to the parallel of 28°, or even of 32°.* In advancing from the southward, you ought to attain the meridian of, and sight the Island of Trinidad, in 20° 31′ S. and 29° 19′ W.; then tack about and leave the island on the starboard side, as you cannot always double the projecting points on the eastern shore. On proceeding hence, northward, the winds will be found nearly approaching East and S.E., and so facilitate the proper route. By acting in this way, it will rarely happen that you cannot pass to windward of the Isle Fernando Noronha, and cross the Line between the 28th and 36th degrees of longitude (West of Greenwich), or, if circumstances require it, one or two degrees more to the West.

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* Rio Janeiro to Cape Frio, &c.—Mr. Wood says, "Between the months of September and March, when the northerly winds prevail, as well as a current to the southword, it is advisable, after doubling Cape Frio, to stand to the eastward into the tracks of the Indiamen, endeavouring, if possible, to keep within the tropic; as it is of little service to go round, unless you can weather the land on the other tack, as the wind always heads you as you draw in shore, besides a current on your weather bow.

On quitting Pernambuco, or the points in its vicinity, you may not always be able to get to the northward on the starboard tack. The direction of this coast inclines from the North to the West, and the winds are mostly from the eastward; but, at the same time, you may gain a good offing in directing your course to the northward. Should, however, the winds not permit you to proceed freely on this route, it will be preferable to make a long board to the S.E., and then act according to circumstances.

8.—BRASIL TO THE CAPE OF GOOD HOPE.

It has been shown that, during the greater part of the year, the S.E. trade wind fails about the tropic of Capricorn, or in lat. 23½° S., and that here the wind is found to veer from the eastward to N.E. and more northerly; the latter prevailing more than any other in the vicinity of the S.E. trade, down to the parallels of 34° or 35° S. between the American coast and the meridian of Greenwich.

A vessel from Brasil, therefore, having advanced to the southward of the S.E. trade, will probably, in every season, meet with brisk winds veering from N.E. to N.W., and sometimes even so favourable as from West and W.S.W. But those most prevalent are from between N.W. and North, accompanied with fine weather and smooth water. If cloudy weather accompanies these northerly or N.W. winds, there is a risk of a sudden shift to S.W. or South, which may happen instantaneously, and must be guarded against.

In some "Notes" on the voyage of H.M.S. *Thunderer* to the Mauritius and back Mr. H. Davy, M.R.N., observes, "The winds varied in circles the very opposite to those of the North Atlantic, and the phenomena attending them, although in exact accordance, were also in opposition. The wind at South goes to S.E., East, North, and what in England would be termed backing against the sun; so also it happens that a vessel may be running with a westerly breeze, and be taken aback with a south-easter. In like manner a vessel in our Atlantic, running with a S.E. wind, is liable to be taken aback with a north-wester, and many a goodly ship has met her doom by these instantaneous shifts. In both hemispheres those changes are preceded by lightning, and to the careful seaman it is only needful to forego the run, and place the ship on the tack she must come up on."

A ship, by running to the eastward, in the track of these winds, gradually increases her latitude southward, and often makes greater progress than by running down to 37° or 38°, where they may be found more westerly; for, although in these high latitudes westerly winds mostly prevail, the winds are very often unsettled, and sometimes shift around the horizon, in the course of the sun, every two, three, or four days, with intervening calms, particularly when prevalent from the south-westward. It is not, therefore, recommended to a ship to increase her latitude to more than 35° until she has reached the meridian of Greenwich: she may then, advancing toward the Cape, proceed into 36° or 37°; for southerly winds prevail around the Cape land from January to April, and sometimes in other months, and extend far to the westward, being commonly found between the Cape and the meridian of Greenwich: consequently it is prudent for a ship bound to the Cape, in this season, to increase her latitude to 35° or 35½°, on coming into East longitude. By thence keeping that parallel till in about 17° E., she will make the land, and enter Table Bay or False Bay, according to the directions given hereafter.

9. THE ROUTES OF STEAM VESSELS BETWEEN ENGLAND AND THE CAPE OF GOOD HOPE.

BY COMMANDER FISHBOURNE, R.N.

Some steamers have taken the eastern passage to the Cape of Good Hope, erroneously considering that they will invariably have land and sea breezes to aid them to the southward, and that they will be enabled to get fuel, not only in sufficient quantity, but with facility. The green wood which is to be had is a very insufficient fuel for obtaining full steam, and even this is not to be procured without delay. It is far better to coal at Ascension; but even this delay may be avoided by husbanding fuel on the passage from England.

For instance, let a vessel leave England with fourteen days' coal on board, and have also the ordinary amount of sail that our men-of-war steamers have, such as the *Vixen*. Then, working expansively, and taking advantage of the winds, she need not expend more than seven days' coal before she arrives in the S.E. trade, from which she must sail, with one engine going, to the southern limits, which may thus be reached by vessels such as the *Vixen* in eight or nine days; and the westerly winds may be reached in one day more, having expended there from twelve to thirteen days' coal. These westerly winds will run her to the Cape in eight or nine days, or even to a position to fetch Mauritius with the S.E. trade in five days more. If she be bound to China, this would be advisable; though in following this route she may have gone much to the southward of her direct course to the Cape, she will yet have attained to a latitude in which the degrees of longitude are so short as nearly to compensate for that but apparent great difference. Now, let it be supposed that the same vessel shall have gone to Ascension with only the same consumption of coals, or two days' at least more. If she objects to make the detour necessary to fetch it under sail, this she cannot effect under two or six days more time. She will not then complete her coals, in the first case, under six days, and in the second case, under eight days. She will not then reach the Cape of Good Hope, if she steer direct, in fourteen days' time, and may be blown off by a south-easter, and then have to stand to the southward under sail, her coals being expended: while if she shape her course to the southward of a great sailing course, as far as may be, without increasing her distance above that of a direct course distance, she will have arrived in the westerly winds, which will run her into the Cape so as to insure fetching, though a south-easter should catch her; and this in about fifteen days, perhaps, with a saving of one or two days' coal, which are valuable to contend with any unforeseen difficulties which might occur; for instance, they might enable her to steam in against a north-wester. Then, suppose a similar vessel to make the eastern passage, and to complete her coals at Fernando Po; she will not arrive at this place till six days, at least, after another may have reached the northern limit of the S.E. trade; she will then require six days to complete her coals. She will not then reach the Cape, husbanding her coals as she may, under twenty days, for which she must have eighteen days' fuel. If she stop anywhere to obtain the four days' above her ordinary quantity, it will occupy fully eight days; if not, eight days will not be more than enough to allow for completing the passage under sail.

10. FROM THE EQUATOR TOWARDS THE CAPE OF GOOD HOPE.

BY CAPTAIN MAURY.

The following remarks on the voyage down the South Atlantic towards and around the Cape of Good Hope are from the 8th Edition of Captain Maury's Sailing Directions, and are a portion of his discussion of the best routes from lat. 0° to long. 0°.

In the eye of commerce and navigation, the North and South Atlantic present themselves in very different aspects. The waters of the former are ploughed by almost every ship in the world; the great thoroughfares in it lie crosswise; they run from side to side, as between Europe and America; and the argosies of commerce ply back and forth on the business of trade, in this sea, like a weaver's shuttle.

On the other hand, Africa is wild, South America is without ships, and there is very little business between them, and consequently less coming and going between the opposite shores of the South than of the North Atlantic. The thoroughfares on it are not crosswise, but rather lengthwise, in this sea.

Now, the best place of entering this sea is the same for all vessels, whether from Europe or the United States. and whether they be bound to South America or around either of the great southern capes.

If a chain were stretched along the equator so that no vessel could pass between the meridian of 20° W. and Africa, navigation, at least as far as India and China, Australia, California, Brasil, and Pacific traders are concerned, would not be incommoded in the least, either on the outward or the inward voyage.

It is to the West of 25° W. that vessels from Europe have been advised to cross the line. This brings the great route for trans-equatorial voyages both from Europe and America into one through the South Atlantic; consequently, the sailing directions from the line to Cape Horn are the same, whether the vessel be from Europe or America; and so, also, are they the same from the line as far as the offings of Good Hope for all vessels, whether from Europe or America, that are bound anywhere between Australia and the Straits of Sunda.

Therefore, before discussing any other route through the South Atlantic, it will be well to take a general view of the routes through that ocean, especially for the benefit of those navigators who are bound to or around the Cape of Good Hope.

Navigators coming from Europe think it out of the way when they are advised to cross the line on the American side. They say, admit that on account of the winds you can from the Lizard reach the line in 30° W. as soon as you can in 20° W., yet from 20° W. on the line to the fair way of Good Hope the distance is 400 miles less than it is from 30° W. on the line.

The distance from the Lizard *via* lat. 0°, long. 30° W., to the fair way of the Cape of Good Hope, is 6,600 miles; whereas, along the usual route *via* lat. 0°, and 20° W., it is only 6,000 miles. This difference, many mantain, cannot be made up by the winds. Let us see. The tables of time and crossings from the Lizard to the line show that the western route and a crossing on the American side, as West of 26° may be called, do give the shortest passages to the line.

In another page will be found a table of crossing "from latitude 0° to longitude 0°," which table serves as a guide that far for all vessels bound to or beyond the Cape of Good Hope. In that table the vessels that cross the equator East of 26° are separated from those that cross it West of that meridian, and it appears that those which cross the equator on the American side, *i.e.*, West of 26°, do, notwithstanding the increased distance, actually make on the average shorter passages to the fair way of Good Hope than those do which cross East of 26° W.

From the line down through the south-east trades of the Atlantic to the prime meridian, the tables published at Utrecht give the time and crossings of 424 Dutch vessels. Of these, 55 crossed the equator to the West of its point of intersection with the meridian of 26° W.; and the rest (369), to the East of that meridian. To the line the average time of crossing appears, by the Dutch logs, to be—East of 26°, 33·4 days in 22° 15′, and West of 26°, 32·3 days in 29° 34′. Again confirming what the charts have suggested in favour of a more westwardly crossing.

From these tables and the Dutch we derive the following statement as to the average passage from lat. 0° to long. 0°, on the route to India, of those vessels that cross the equator West, and of those vessels that cross it East of its intersection with the meridian of 26° W.

From latitude 0° to longitude 0°, along the route through the trades of South Atlantic to Cape of Good Hope and ports beyond.

Months.	Crossings E. of 26° on the Equator.					
	Dutch Vessels.			American.		
	Lat. 0°	Long. 0°.	Days.	Days.	Lat. 0°.	Long. 0°.
	Long.	*Lat.*				
January	22°·7 W.	37°·2 S.	25·5	23·8	23°·9 W.	36°·4 S.
February	21	37	25·7	25·8	21·8	37·4
March	21·7	37	27·4	28·0	22·6	38·1
April	23·7	36·2	25·4	26·7	21·2	36·5
May	23·7	36·2	26·3	27·2	21·2	35·7
June	24·2	36	24·8	25·0	22·5	35·
July	21·7	36·5	25·0	22·2	23·6	35·6
August	20·5	36·2	24·5	24·2	22·4	35·8
September	21·7	36·5	24·0	22·1	22·3	37·5
October	25·7	37	21·8	25·1	21·7	39·6
November	23·7	37·5	22·8	23·4	23·7	37·2
December	22·7	37	23·8	23·0	24·5	39·5
Mean	22·7	36·8	24·8	24·7	22·6	37

Months.	Crossings W. of 26° on the Equator.					
	American.			Dutch.		
	Days.	Lat. 0°.	Long. 0°.	Days.	Lat. 0°.	Long. 0°.
January	24·7	29°·7 W.	38°·8 S.			
February	25·3	28·3	37·3			
March	25·4	27·7	38·7			
April	24·6	28·1	36·7			
May	27·2	28 9	37·7			
June	25·5	28·7	36·4			
July	23·7	28·7	37·2			
August	25·8	28·3	41·3			
September	23·6	28·9	38·4			
October	22·3	29·4	39·2			
November	22·2	21·4	39·3			
December	24·5	29·3	37·9			
Mean	24·6	29·0	38·2	24·9	29°·9	36°·9

These times and crossings are derived from the means of 310 American and 424 Dutch ships. The agreement between them, as to time, is remarkable. The mean crossings of each fleet East of 26° are so nearly at the same place that they enable us to judge as to the average sailing qualities of the Dutch and American vessels on their *outward* voyage around the Cape of Good Hope. From the place of their eastern crossing of latitude 0° to their crossing of longitude 0° in the South Atlantic the distance in round numbers is 2,500 miles, and the time 24·6 days by the American and 24·7 by the Dutch—a difference so small that it may be considered merely accidental, and not as owing to any difference, as to sailing qualities, between the two classes of ships. The tracks therefore may be considered as identical, both as to route, time, and distance. The average distance "*made* good" along this part of the main eastern track is about 105 miles a day both by Dutchmen and Americans.

It is of great consequence to know the relative sailing qualities of the vessels that, under different flags, are co-operating with us; especially of those whose logs, like the Dutch, English, and French, may be subjected to a separate and independent discussion.

From the western crossing the difference of time is a little more marked—the distance from the crossing on the equator to the prime meridian being, by the Dutch track, about 2,700 miles, by the American 175 further—the Americans making the run in about seven hours less time.

If the average rate of sailing—viz., 105 miles good per day—from the eastern crossing be assumed as the average rate for vessels that cross West also, we may rightly infer that from the western crossing the American vessels really gain during the run to the prime meridian about two days' sail—viz., they go 175 miles further in less time than the Dutch—and at the end of that time they are really in a better position for continuing the voyage, *for the further you cross the prime meridian the better*—*i. e.*, the parallel of 38° S. intersects it at a better crossing place than the parallel of 37° does ; and for all vessels bound to Australia, China, or India, the best crossing of longitude 0° is about 40° S., and rather to the South than to the North of that parallel.

Seeing, then, that we cannot ascribe the difference of two days to the sailing qualities of the vessels—Dutch and American on the *outward* voyage—to what shall we ascribe it? Clearly we may set it down as being due to difference of winds. Owing to the winds, the distance actually sailed from the eastern crossing to the prime meridian is quite as great if not greater than that from the western crossings. This will appear obvious by the inspection either of the track charts of the South Atlantic or of the time tables from latitude 0° to longitude 0°.

It will be observed that the outward tracks of those India-bound vessels which cross the line about 25° make, through the S.E. trades, a sort of curve, of which the centre is situated somewhere on the continent of Africa, thus indicating that the S.E. trades have more southing in them on the eastern than on the western side of the Atlantic.

The mean crossing on the equator by the vessels that go East of 26° is in 22° 40′ W., and of those that go West it is in longitude 29° 28′. The mean crossing of 20° S. by the former is in 29°, or 6° 20′ to the West of their crossing at the equator, while for the latter it is only 2° 14′. Consequently a vessel that crosses the equator at the mean place E. of 26° has to make thence to 20° S. a course of South 17° W., whereas one that crosses the equator at the mean crossing West has to make to 20° S. a course of South 7° W. only, as per following table :—

CROSSINGS.

Months.	East, between long. 26° and 20° on the equator.					
	Dutch vessels.			American vessels.		
	Equator.	20° S.	Longitude	Equator.	20° S.	Longitude.
	°	°	°	° ′	° ′	° ′
January	23¾W.	30¼W.	6½W.	23 56W.	28 47W.	4 51W.
February	23¾	30¼	6¾	21 48	29 50	8 2
March	22¼	29¾	7¾	22 38	28 29	5 51
April	22½	30½	8¼	21 13	27 20	6 7
May	23¾	31⅛	7¾	21 11	29 0	7 49
June	24¼	32¼	8	22 29	29 38	7 9
July	23¾	32¼	8½	23 34	29 27	5 53
August	24¼	30¾	6¾	22 26	30 7	7 41
September	23¼	29	5¾	22 16	29 52	7 36
October	24⅛	29	4⅜	21 41	27 31	5 50
November	25¾	29	3¼	23 46	28 12	4 26
December	24⅛	28¾	4¼	24 32	28 4	3 32
	23 50	30 16	6 26	22 38	28 51	6 14

Months.	West of 26° on the equator.					
	American vessels.			Dutch vessels.		
	Equator.	20° S.	Longitude.	Equator.	20° S.	Longitude.
	° ′	° ′	° ′	° ′	° ′	° ′
January	29 40W.	30 59W.	1 19	......	......	......
February	28 20	30 59	2 39	......	......	......
March	27 42	30 6	2 24	......	......	......
April	28 9	33 7	4 58	......	......	......
May	28 56	33 14	4 18	......	......	......
June	28 42	33 55	5 13	......	......	......
July	28 42	34 0	5 18	......	......	......
August	29 17	33 20	4 3	......	......	......
September	28 59	31 53	2 54	......	......	......
October	29 24	30 57	1 33	......	......	......
November	31 23	27 55	3 28	......	......	......
December	29 18	30 2	0 44	29 54	32 24	2 30
	29 3	31 42	2 39	29 54	32 24	2 30

We have still further evidence going to show that the winds on the Brasil side have more easting in them than those on the African side of the Atlantic. Attention was called to this fact in the earlier editions of this work. It has an important bearing in favour of the western crossing.

The Dutch crossings are in their sailing directions arranged in two divisions; one group giving the tracks of all that crossed the line West of 20°, and the other all those that crossed it East of 20°. We have still further divided those of the first group into crossings East and crossings West of 26°, as per foregoing table. Let us now see what is the average course which vessels make to reach 20° S. after crossing the equator East of 20°; what after crossing the equator between 20° and 26°; and what after crossing it West of 26°; and also what is the prevailing course of the S.E. trades along the route from these several crossings of the line to 20° S.

The Dutch tables contain the means of 75 vessels that crossed East of 20°. Their mean place of crossing was for the equator, in long. 18° 3′ W. (?); and for 20° S. in long. 26° 40′. Consequently, from the equator to 20° S. the vessels that take this route make "good" no better than a course of S. 23° W. Treating the other crossings in the same way, it appears that the mean direction of the S.E. trade wind between latitude 0° and 20° S. is, for those vessels that cross in 18° W., S.E.; for those that cross it in 22°, S.E. ½ E.; and for those that cross in 30°, S.E. by E. ½ E.

This is a curious but well-established fact about the trades of the South Atlantic. It shows conclusively that an India-bound vessel is in a better position when she is crossing the line in 30° W. than she is when crossing it in 20°, and that she can reach her port about two days sooner from the western than she can from the eastern crossing.

11. CAPE OF GOOD HOPE TO ENGLAND.

The General Directions given to ships, on leaving the Cape for England, are as follow :—

Having rounded the Cape a direct course for St. Helena is nearly N.N.W. ¼ W. by compass [*N.W. ¼ W.*], 566 leagues: but prudence requires a course at first N.W. by N. until such a distance from the land is gained as to obviate all risk from squalls at N.W. and W.N.W., which, at times, are experienced near the coast. A direct course, N.N.W., will then be fair for the island.

With a strong wind, veering to the E.S.E., allowance for a leeward current should be made, particularly in cloudy weather, and when the longitude is uncertain. In this case, make the latitude of the island several leagues to the eastward of it. Then proceed to haul around the N.E. or Sugar-loaf Point for the anchorage, as shown hereafter.

On quitting St. Helena, a direct course for Ascension may be taken. This is N.W. by N. by compass [*N.W. ¼ W.*], distance 233 leagues. In this part a steady S.E. trade generally prevails throughout the year, and generally a westerly current. Ascension may be passed on either side, but the more common practice is to pass it on the West, at from 3 or 4 to 10 or 12 leagues.

From Ascension steer N.N.W. or N. by W. ½ W., so as to cross the equator between the meridians of 18° and 25°, and thence proceed as shown in our Book for the Atlantic Ocean.

Captain Maury has also devoted much labour to the discussion of this route, and the following is the result of his enquiries :—

12. FROM THE OFFINGS OF THE CAPE OF GOOD HOPE HOME.

After having doubled the Cape and crossed the parallel of 30° S. in the Atlantic we come to a fork in the track of homeward-bound Indiamen. Arriving at this fork in the road, the European fleet bears to the right, and crosses the equator at a mean near long. 21° 25′. The American fleet keeps to the left, and has its average crossing of the equator near the meridian of 33° 30′ W. Such are the mean crossing places of the two fleets. To reach the line the American fleet has to run by an air line about 500 miles further than the Dutch; but it has the advantage of half a knot an hour in average speed, which reduces the difference in time to the line to a day and a half. It will be recollected that the American fleet from the Straits of Sunda, sailing on the same water and with the same winds down the Indian Ocean, beats the American fleet from Calcutta by 12, and the Dutch fleet from Batavia and the Straits of Bally by 20 miles a day on the average. The two American fleets sail over the same ground after reaching the offings of the Cape. Consequently, their joint average, considering the number of sail in each, should exceed the average miles "made good" by the Dutch fleet in the Atlantic by 16 or 17 miles a day over the same water and with the same winds.

I shall discuss the homeward route from the fairway of Good Hope, both to Europe and America, in this chapter, and, as preliminary thereto, offer a series of tables of crossings from long. 0° to the line, and thence to 30° N., which were compiled by Lieutenants Guthrie, Young, and Forrest.

From the tables which were drawn up we may deduce the following comparative statement of the average monthly runs of American and Dutch vessels through the trade winds of the Atlantic.

Months.	From 30° S. to the Line.					
	American.			Dutch.		
	From 30° S.	Days.	To Line.	From 30° S.	Days.	To Line.
	°		°	°		°
January	10 E.	21·8	32.8 W.	11¼ E.	20·7	21 W.
February	8·8	22·1	33·2	11¼	20·5	20½
March	9·8	21·4	33·5	10¾	20	20¾
April	10·0	22·4	31·9	11½	20·1	20½
May	10·6	22·2	34·3	11⅓	20·9	21¾
June	11·1	20·7	34·2	11⅓	19·8	21½
July	10·7	21·4	34·	11½	20·4	21⅓
August	10·8	22·4	32 8	11¼	20·1	20¾
September	10·2	20·8	34·2	11½	19·1	20¾
October	10·8	22·6	34·9	11¼	18·1	20¼
November	9·3	19·6	33·2	11½	19·7	20½
December	9·2	21·1	33·	11	19·4	20½
Means	10·1	21·5	33·5	11·3	20	21·4

Months.	From the Line to 30° N. and to Port.					
	American.			Dutch.		
	Days.	From 30° N.	To Port.	Days.	From 30° N.	To Port.
		°	*Days.*		°	*Days.*
January	17·9	68 W.	29·2	20·6	37⅛	41·4
February	19	65·6	30·2	18·5	38	42·6
March	17	67	25·7	18·4	38¾	41
April	18	67	24	20·1	38	41·4
May	17·6	66·6	23·7	20·9	38⅛	41·6
June	17·8	63·7	26	20·5	38⅛	41·8
July	19	66·7	28·5	19·1	38	41·7
August	23·2	64·5	32·9	18·6	35¾	41·2
September	22·8	64·6	33·8	19·5	34¾	42
October	20	65·7	28·8	20·4	35¼	41
November	21·6	68·9	32·4	19·8	34¼	38·6
December	18·8	68·1	32	19·5	35⅛	35·2
Means	19·3	66·4	28·9	19·7	36·9	40·8

	Days.		*Miles.*	*Per Day.*
American—From 30° S. and 10°·1 E. to Line in 33°·5	21·5	Distance	360	= 142
Dutch—From 30° S. and 11°·3 E. to Line in 21°·9	20	Distance	2,600	= 130
American—From 0° and 33°·5 to 30° N. and 66°·4 W.	19·3	Distance	2,620	= 137
Dutch—From 0° and 21°·4 to 30° N. and 36°·9 W.	19·7	Distance	2,030	= 103
American—From 30° N. and 66°·4 W. to New York	9·5	Distance	730	= 77
Dutch—From 30° N. and 36°·9 W. to Lizard	21·1	Distance	1,830	= 87

Referring to this table it appears that the average difference of speed through the S.E. trades of the Atlantic, instead of being about three-quarters of a knot an hour in favour of the American fleet, as according to the estimate it should be, is only one-half a knot. It was three-quarters of a knot and more over the same route and through the same winds in the Indian Ocean; but in the South Atlantic the two fleets have separated and the Dutch have the wind a little more quartering.

From this circumstance we are entitled to infer that in that portion of the South Atlantic which lies between the forks of the road made by the homeward-bound Dutch and American East Indiamen there is no appreciable difference in the average strength of the S.E. trades.

However this may be as to the *average* strength of the whole belt, it appears that the average strength of the winds between 15° and 10° S. is at a maximum along the American and at a minimum along the European track, for the Dutch crossings may be taken fairly to represent the homeward track of all European Indiamen. Between 10° and 15° S. the American average speed is 149, the Dutch 122 miles a day. The mean of a still greater number will probably reduce this difference by increasing the Dutch average somewhat, which, between these parallels, is only 122 miles, if it do not decrease the American average, which is 149 miles a day. It would, therefore, perhaps be more correct to say that the band of freshest winds in the South Atlantic lies between the parallels of 5° and 15° for the American, and between 10° and the equator for the European route.

SECTION IV.

DESCRIPTION OF THE ISLANDS AND SHOALS OF THE SOUTH ATLANTIC OCEAN.

I.—SHOALS, ETC., IN THE VICINITY OF THE EQUATOR.

HAVING given, in our Book of the ATLANTIC OCEAN, a particular detail of all the known dangers to the northward of the Line, it is not requisite to give a repetition of such as there described.

VOLCANIC REGION.—In the neighbourhood of the equator, between longitude 18° and 21° W., there appears to be a tract which has been very fertile in the production of vigias, and although the recent American Exploring Expedition under Captain Charles Wilkes has disproved the existence of any dangers in that vicinity that have been described, still the concurring testimony of so many navigators, as to dangers being seen, and even soundings obtained, that we must be compelled to believe that they are not without some foundation.

By comparing the following statements, it will be seen that they all refer to a comparatively limited space; and if, as is not improbable, that the earlier statements are to the *eastward* of the true positions, it will reduce the extent in which they have been met with to still narrower limits. The volcanic agency which appears to be so active in this spot in the middle of the ocean has very likely caused the elevation of shoals, which have subsided, and left no trace of their existence.

It is known that when earthquakes are felt at sea, they produce upon vessels an exactly similar effect to striking on a rock or running aground. Thus, in that which took place on the coast of Chilé, in 1835, and which extended over a space of more than 15° North and South, and 10° East and West, the vessels under sail or at anchor felt the shocks as if they rubbed against rocks;* and that which took place at Odessa on the 9th February, 1838, presented precisely the same circumstances.†

It would be interesting to learn what is the depth of the ocean at this part, for although it would be a great chance that, in trying for soundings, any of the submarine heads or peaks, which we may infer do exist, would be touched upon, still the enormous upheaving force that would be necessary to raise a mountain from a great depth would lead us to suppose that the general depth is not more than might be attained. Although in the experiments of Sir Edw. Belcher, before stated, he was unsuccessful in finding the bottom with the enormous length of 3,065 fathoms of line, at 450 miles eastward, in long. 10° 37′ W., lat. 0° 24′ N., yet at a greater distance from the African coast, in lat. 4° 14½′ S., long. 9° 37½′ W., he struck the bottom in 1,615 fathoms; this is about 550 miles E.S.E. from the region under consideration.

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* Journal of the Royal Geographical Society, vol. VI., p. 329.

† Journal des Debats, February 27th, 1838.

We subjoin the various notices that we have been able to collect on this subject, which will prove interesting to the navigator, as it refers to that part of the equator which is generally traversed; and although no danger is to be apprehended from those that have been seen, still it will be of service in throwing a light on any unusual occurrence that may be met with in this vicinity.

First, then, on the authority of M. D'Après:—

"On the 5th of February, 1754, the people on board the ship *Le Silhouette*, commanded by M. Pintault, felt a shock, or violent agaitation, as if the vessel had touched upon a shoal: it was then about 5ʰ p.m., and from the latitude taken by that very day's observation, this dangerous spot should be 20′ to the southward of the Line, in about 20° 50′ West longitude, according to their reckoning, which they traced upon the French chart, from the road of Praya, in the Isle of St. Iago.

"On the 13th of April, 1758, the frigate *La Fidèle*, M. Le Houx commander, felt also the like shocks in 20′ South latitude, and 18° 0′ West longitude.

"On the 3rd of May, 1761, *Le Vaillant*, Captain Bouvet, about 1ʰ p.m. saw a *small sandy island*, which bore N. by E, The latitude by the reckoning at noon was about 23′ South, and their longitude, reckoned from the sight of Ferro Island, which they made on the 8th of April, was about 19° 10′ West.

"On the 17th of October, 1747, the ship *Le Prince*, Captain Bobriant, in its passage to India, felt one or two shocks, as if it had struck upon a shelf. She was at that time in lat. 1° 35 South, and about 17° 15′ West longitude, reckoned from the sight they had of the Isle of Brava."

Some breakers were seen, in 1730, in lat. 2° North, and long. 22° 18′, according to M. Rochette. They were known as *Cæsar Breakers*.

A shoal, 3 leagues in circumference, and even with the water's edge, is stated to have been seen by several French East India ships, and placed by the French hydrographers in lat. 4° 15′ N., long. 19° 20′. The Spanish chart stated it to have been seen in 1796, and an English chart exhibited it in lat. 4° 5′ N. and long. 20° 35′.

October 3rd, 1771, *Le Pacifique* frigate, Capt. Bonfils, in a voyage from the Cote d'Or to St. Domingo, felt at 8ʰ p.m. a shock or extraordinary trembling, similar to that which is felt on a vessel's grounding, or rather like that of a launch. They put back immediately, and sounded, but without finding bottom. They were in lat. 0° 42′ S., long., by reckoning, 22° 47′ W. The sea was greatly agitated.—*M. Daussy.*

Another danger is indicated as follows, by the voyage of Commodore (now Admiral) Krusenstern:—

On the 19th of May, 1806, at 5ʰ in the evening, "we saw, in lat. 2° 43′ S., long. 20° 35′ W., in the direction of N.N.W., and at the distance of about 12 or 15 miles, a singular phenomenon; but which, owing to the lateness of the day, we were unable to examine sufficiently close to ascertain the nature of it. A cloud of smoke arose to about the height of a ship's mast, disappeared suddenly, then arose again, and vanished entirely. It could not be a waterspout, nor a ship on fire, as some persons on board conceived, for the smoke rose much too high; and Dr. Horner was of opinion that, if the whole was not an ocular deception, occasioned by a peculiar refaction of the rays of light, it had all the appearance of a volcanic eruption, and was, possibly, the forerunner of an island."

We have not the least doubt of its being a volcanic eruption. Its true longitude is probably 20° 44′ W.

In lat. 5° 4′ 23″ N., long. 21° 25′ 40″ W., the *Warley*, E.I.S., passed a shoal on May 7th, 1813. They had no time to sound, but supposed that there were about *seven fathoms on it: the bottom was distinctly seen*, and consisted of ridges of rocks, with sand between them. It was of small extent, not exceeding a quarter of a cable in length.

Although not in this precise neighbourhood, the following, perhaps, is in connexion with it:—on the 1st of May, 1824, indications of a volcanic eruption were seen in about 7° N. and 21° 50′ W. These were a hissing and bubbling up of the waves, resembling the ebullition of boiling water, and whitened with foam.—(*Lieutenant Evans.*)

Captain Proudfoot, in the ship *Triton*, from Calcutta to Gibraltar, passed over a shoal on the 18th of December, 1816, in lat. 0° 32′ S., long. 17° 37′ W., by mean of two chronometers, adjusted at St. Helena to Captain Horsburgh's longitude. [This, corrected, will be about 17° 46′.] It appeared to extend in an East and West direction, 3 miles; and in a North and South direction, 1 mile. *Sounded in* 23 *fathoms, brown sand*: saw no appearance of breakers.

According to a report made by Mr. Fraser, of the ship *St. George*, that a *reef, with high breakers*, had been seen in the night of the 14th of October, 1830, in lat. 6° 35′ S., long. 12° 57′ W., a diligent search for it was made by H.M.S. *Dryad*, accompanied by her tender, on the 14th of January, 1832. On the following day the Dryad was upon the exact spot, the tender bearing N.W. 4 or 5 miles, the day very fine and clear, a five or six knot breeze by the wind, and sufficient swell to break upon a shoal; nothing, however, indicating the existence of such a shoal could be found. For particulars, see the "Nautical Magazine," December, 1832, p. 561.

On the 12th of April, 1831, the *Aquila*, of Scarboro', Captain John Taylor, was in lat. 0° 22′ 15″ S., long. 21° 6′ 30″ W., light winds and fine pleasant weather. At 40^{m} p.m., the water being very smooth, and the ship going at the rate of five knots, a loud rumbling noise was heard under her bottom, and a sensation felt, exactly like that of a vessel sliding over a rock: the rudder was so much agitated that the man who was steering could scarcely hold the wheel. No difference could be observed in the colour of the water, nor the smallest rippling. The captain concluded, at first, that it must have been a rock; but after arriving in London, there was not on examination, the least sign of any rub on the copper; and it was concluded that there must have been, in the spot above mentioned, a volcanic eruption, the shock of which did not exceed 15″. The situation of the *Aquila* was very near that of the *Silhouette*, in 1754.

November, 1832. The ship *La Seine*, Capt. Le Marié, being in lat. 0° 22′ S., long. 21° 15′ W., and going from 4 to 5 knots, felt at 11^{h} p.m. a shock so violent that he thought they had struck on a bank.—*M. Daussy.*

On the 9th of February, 1835, the bark *Crown*, of Liverpool, after crossing the equator with a pleasant breeze at E.S.E. and running at the rate of 6½ knots, at 10^{h} 30^{m} p.m. touched the ground and grated for a short time with the keel, as if passing over a coral reef; so soon as clear, the boat was lowered down, but no bottom was found at 120 fathoms deep. The latitude of the spot was 57′ South, and the mean longitude, by chronometers and lunars, 23° 19′ W. For further particulars, see the "Nautical Magazine," October, 1835, p. 577.

From the journal of Captain Jayer, commander of the *Philantrope*, of Bordeaux.—"On the 28th of January, 1836, at 9^{h} in the evening, being in about 0° 40′ S. lat., and 20° 10′ W. long., we felt an earthquake, which made the vessel shake during three minutes, as if she were scraping along a bank, and to such a degree that I was certain she was aground." And again he says, "From the 13th to the 16th of March, fine weather, we were in sight of an American vessel, the *St. Paul*, of Salem, going to Manilla. This vessel, which we had seen under the Line, had felt the same earthquake which we had experienced, and at the same time, being 10 miles West of us." *—*M. Daussy.*

In the number for November, 1836, of the Transactions of the Asiatic Society of Bengal, is the following extract from the proceedings of the Society of Calcutta:—"Mr. T. L. Huntley presents some volcanic ashes, collected at sea by Capt. Ferguson, of the ship *Henry Tanner*. These ashes were black, and had the same consistence as those of coal. The spot where they were picked up was 0° 35′ S., and 15° 50′ W.; the sea being in a violent agitation." In a former voyage made by the same officer, and almost in the same place, lat. 1° 35′ S., long. 20° 27′ W., we had been greatly alarmed by hearing a very great noise. The captain and officers thought that the ship had struck on a coral rock; but, in sounding, they could not reach the bottom.

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* Comptes Rendus, Acad. des Sciences de Paris, April, 1838.

Captain Sprowle, of the *Circassian*, is stated to have seen a sand bank under water, but just visible in the hollow of the sea, in lat. 1° S., long. 19° W., which makes it in the direct track of vessels homeward bound from St, Helena, &c. Horsburg makes no mention in his directory of any bank having been seen here, and it is more than probable that vessels have sailed immediately over it. No coloured water has, that we are aware of, ever been seen here; and if it were not for the difference of 2° of longitude between this supposed bank and that of Vigia, it might be concluded that it must have been the latter. As there can, however, be but little doubt, if the latitude and longitude be given correct, that such a bank does exist, it is highly important that the government should take some steps in this important matter, and that captains of vessels bound for the East Indies should endeavour to corroborate it for the safety of all mariners.—"Times," January 14th, 1841.

The following, perhaps overdrawn statement, appeared in the newspapers of February, 1853. "An extraordinary marine convulsion was experienced by the *Maries*, on her passage to Caldera. On the morning of the 13th of October, the ship being 12 miles from the equator, in long. 19° W., a rumbling noise appeared to issue from the ocean, which gradually increased in sound till the uproar became deafening; the sea rose in mountainous waves; the wind blowing from all quarters, the control over the ship was lost, and she pitched and rose frightfully, all on board expecting each moment to be their last. This continued 15^m; the water then gradually subsided, when several vessels in sight at the commencement of the convulsion were found to have disappeared. Shortly after a quantity of wreck, a part of a screw steamer, was passed, so that some vessels and lives were lost."

Another occurrence is as follows:—Ship *Ann Mary*, of Liverpool, Mr. Rackham commander, on a voyage from Liverpool towards Bombay, commencing 1st January, 1842. "Made Ferro January 19th; 22nd, passed the position assigned to *Maria's Shoal*, water a little discoloured. Passed to the eastward of Cape Verde Islands, strong and steady trades. February 5th, light breezes, smooth water, fine weather; at 5^h a.m. was aroused from sleep by a violent shaking of the vessel, and a loud rumbling noise. My first idea was that the vessel was on one of the dangers hereabouts, the next that we had been struck by lightning, and that the masts were all tumbling down; by this I was on deck, looked over the side, the vessel going through the water, but shaking as if she would fall to pieces, so that the man at the helm could not hold it. All hands were now on deck, and panicstruck at this awful earthquake; it lasted nearly a minute; 5^h 50^m a slighter shock; 9^h 45^m a fainter; and near noon one scarcely perceptible. At noon observed in lat. 0° 44′ S., and chronometer brought down 20° 16′ W., from 5^h a.m. made a S.W. course 26 miles. It is probable that this submarine ebullition may have left some danger.*

Another notice of these eruptions is as follows:—

Ship *Sarah Bell*, J. R. Bell, commander, from Port Philip to Liverpool.—In lat. 1° 7′ S., long. 21° 21′ W., on the 3rd of July, 1842, at 4^h a.m., we experienced a very heavy shock of an earthquake, which at first alarmed us very much, as we thought the ship was grinding over a bank or shoal; but the continuous steady noise and agitation of the vessel soon convinced us of the cause; as had it been a shoal, from the sea there was running at the time, the vessel must have been wrecked; as it was she never lost any way, but continued going at the same rate as before. The noise and sensation (as if a heavy chain cable were running out) continued about four minutes.—"Nautical Magazine," 1842, p. 646.

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* It would appear that this was but a commencement of a series of subterranean commotions, which terminated in the destruction of Hayti.—Ed. "Naut. Mag."

On the 17th July (1852?) Capt. J. H. C. Short, when in command of a large ship bound to the East Indies, met with a very singular phenomenon, which will extend the area of this submarine fire action.

"Being in lat. 3° 30′ S., long. 24° 30′ W., sudden trembling of the ship was felt. I was on the lower deck at the time. The mate, who was on deck, called loudly to me, saying, the ship is striking on rocks, for such it appeared to be. I immediately ran on deck and ordered the helm down. Although there was a nice light breeze, the ship would not answer her helm. I looked over the side, the water around us appeared to be agitated, as if boiling, and a short distance from us was a vapour ascending as if from a furnace. All hands witnessed this extraordinary sight. We got the long leadline along, and payed to 110 fathoms, but no bottom was found. The lead and line were very warm when hauled in."—"Nautical Magazine," 1853, page 381.

Captain Ballaird, of the ship *Rambler*, from Calcutta, on Oct. 30th, 1850, in lat. 16° 30′ N., long. 54° 30′ W., and Capt. Potter, of the bark *Millwood*, last from Rio, half an hour later on the same day, when in lat. 23° 30′ N., long. 58° W., each felt a volcanic shock. These vessels were about 520 miles apart. Supposing them to be in direct line, in which the earthquake was travelling, its rate will appear to be about one mile in 5 seconds, which is only a little slower than sound travels through the air.

The U.S. sloop *Vandalia*, December 15th, 1849, near midnight, in lat. 17° 34′ N., long. 55° 49′, experienced the shock of an earthquake, which lasted 5 seconds, and was accompanied by a low rumbling noise, and strong vibration throughout the ship. The wind, which was N.E., immediately veered to East, and decreased.

The Russian ship *Dallas*, W. Wikander, commander, March 20th, 1861, at 7 p.m., lat. 0° 27′ N., long. 20° 30′ W., the ship apparently went over the ground; the ship's masts and yards were shaken. Found afterwards that the false keel had gone.

At the same moment another ship, the *Melbourne*, of Dundee, C. Cowie, master, in lat. 0° 20′ N., long. 20° 35′ W. (that is 8¼ miles distant from the Russian ship, in company), was startled by hearing a loud rumbling noise, and at the same time felt the ship tremble from stem to stern, which lasted 4 or 5 minutes.

The ship *Florence Nightingale*, Capt. Gales, January 25th, 1859, having the St. Paul Rock, or Penedo de San Pedro, bearing N.W. by N. 10 miles, experienced a severe shock. It commenced with a rumbling noise like distant thunder, and lasted about 40 seconds. The sea had been short and irregular, but was succeeded by a heavy swell from N.E., which lasted for several days.

Capt. Whitmore, of the *Sea Serpent*, December 29th, 1859, struck, as he supposed, on a coral reef, in lat. 0° 29′ N., long. 28° 30′ W., in consequence of which he put into Rio. He sounded immediately, and found no bottom, but found afterwards his false keel and copper injured.

The Russian sloop of war, *Passodnik*, struck, as was supposed, on the same shoal, about 24 hours before the *Sea Serpent*, but this proves the nature of the occurrence.

The *Prince*, of Scilly, James Thomas, commander, December 11th, 1853, in lat. 0° 54′ N., long. 26° 50′ W., smooth water, suddenly felt a grinding tremour go through the vessel, as if dragging over something rough and yielding. It continued for about a ship's length, but did not stop her way through the water. The ship did not strike.

The ship, *Maid of Judah*, felt a slight shock Sept. 15th, 1855, lat. 1° 30′ N., long. 25½° W. Strong swell from the southward.

The bark *Eleanor*, Captain G. A. Findlay, March 26th, 1861, 10 a.m., felt a shock as if something very heavy was being rolled about the decks, or as if the ship had gone over some rough ground; it made the vessel tremble only for a few seconds. A rumbling noise heard like distant heavy thunder. Weather remarkably fine; lat. 0° 44′ N., long. 21° 19′ W. Great quantities of fish and sharks around the ship.

These instances, with the others, will afford ample evidence of the general nature and locality of these volcanic shocks.

We have limited the instances here to this particular area on the equator; but there appears to be either an extension of this action far to the northward, or else there is a separate area, for volcanic shocks have been felt as far North as 23° 30′ N., and long. 58° 0′ W.; and from the almost continuous line of discoloured and peculiar water that extends from the equator to this position, as will be presently stated, we are led to infer that there is a line of volcanic action trending parallel to the range of the Antilles.

It being desirable that the reports respecting the existence of some of the foregoing islands should be set at rest, the American Expedition, under Captain Charles Wilkes, explored this region, and from his letter we give the following extracts. The reader will find it in the "Atlantic Memoir," 12th edition, page 687.

"We succeeded in crossing the equator in long. 17° W., on the 5th of November, 1838, and then stood for the *Triton's Bank*, said to be in lat. 0° 32′ S., long. 17° 46′ W. When within a short distance of its position, the squadron hove-to for the purpose of ascertaining our position accurately, after which a course was steered nearly West. Being at the time well to the eastward, we ran on a line due East and West over it: the vessels of the squadron being spread about 3 miles apart, on a line North and South. We did not, however, find it in our progress, or any bottom, or indication of soundings; no *discolouration* of water was visible, or change of temperature, although the line extended 30 miles East and West of its reported position; after which we stood again to the North, and ran over a *vigia*, as laid down on the charts, but none such was found in existence.

"Our next examination was for *Bouvet's Sandy Island*, which was, in like manner, carefully searched after, in and around its position, as laid down on the charts; but our search was equally unsuccessful.

"Finally, search was made in and about lat. 2° 43′ S., long. 20° 35′ W. Extending to the N.N.W. of this point a distance of 30 miles hereabout, having been assigned as the situation of the submarine volcano reported by Admiral Krusenstern, which was supposed might have left a shoal. This locality was twice run over in different directions and carefully examined, with the squadron in open order, but none such was found in existence.

"Lieutenant Hudson, of the *Peacock*, having separated from me on the 16th of October, proceeded on a different course, in search of the same shoals which we were looking for; but was equally unsuccessful in finding any, as appears from the following extract from his report to me, which affords further evidence, if it were needed, of their non-existence.

"After disproving the existence of *Warley's Shoal* and *French Shoal*, he proceeds to say, 'I then made the best of my way for the *Triton Bank*, with the wind hauling and veering from S.S.W. to S.S.E., and passed the equator on the night of the 3rd of November, in long. 17° 40′ W., and continued over and around the locality of that bank until the morning of the 5th; getting casts of the lead, during the time, in from 50 to 250 fathoms, up and down, without finding bottom. I have in my search fully satisfied myself, and hope our examination will prove equally so to you and all others, that these shoals do not exist.'"

By order of the British Admiralty, Captain Wickham, in the *Beagle*, also tried for soundings, on crossing the equator, but did not succeed, with 190 fathoms, in two places; one in 0° 55′ S., and in 22° 52′ W., and the other in the same latitude, in 23° 23′ W., the vessels course being due West between them.*

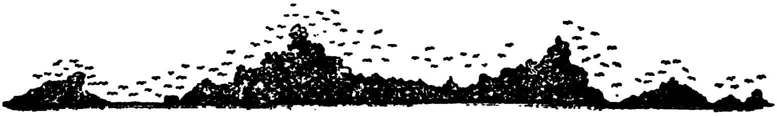
Although the fact of the present existence of shoals, &c., before-mentioned, may be disproved by the result of the American Expedition, still the undeviating testimony of so many navigators to this one particular space, as being subject to volcanic eruptions, will certainly give very great weight to the testimony of their having been seen: and, at the same time, renders it very probable that similar discoveries may occur again.

We cannot conclude our notices on this subject without again recommending this singular region to the observation and attention of the navigator.

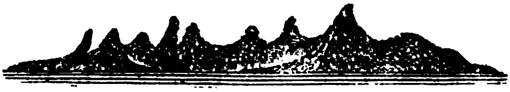
2. PENEDO DE SAN PEDRO, OR ST. PAUL'S ISLETS.

This cluster of five or six craggy steep rocky islets without verdure, whitened with bird's dung, are about half a mile in circumference, and the highest pinnacle 70 feet above the sea, lies in lat. 0° 55′ 45″ N., lon. 29° 21′ W., a position well ascertained as it is the mean between those observed by Captain FitzRoy in 1832, and Sir James Ross in 1839, and therefore well adapted as a point to correct longitudes or rate chronometers.

The appearance annexed has been communicated by the master of a merchant ship.



The rocks change materially in appearance, according to their bearing. The *Tellicherry* passed in sight in 1802, and found that their appearance between N. 30° W. and N. 37° W., 6 or 7 miles distant, was that of a heap of rugged rocks, with low gaps between some of them. The northernmost, a small pyramidal rock rather lower than the rest.



Penedo de St. Pedro, West, 6 miles, as taken by Captain Monteath.

Commodore Brou, in the French frigate *Hermione*, in 1825, describes Peñedo de San Pedro as a mile in extent, in a N.E. and S,W. direction; seen in fine weather 4 to 5 leagues off; when bearing N.W. appearing in the form of three pinnacles of sharp naked rocks of a remarkable shape. The S.W. pinnacle separated a short distance from the others. The latter appears safe to approach, and no breakers were seen to indicate sunken rocks. The *Hermione* sailed round on the eastern side, at the distance of 5 miles; did not try for soundings; but from the colour of the water it was presumed that bottom would not be found.

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* These unsuccessful soundings will prove but little, as they were to the westward of the tract in question.—Ed.

For further observations, the reader is referred to the before quoted paper by M. Daussy, in the Comptes Rendus, &c., April, 1838.

The Equatorial Current set the ship to the westward at the mean rate of 18 miles and to the North 6 miles in the 24 hours, between the parallel of 8° North and the Equator, and the meridians of 28° and 30° W. At the islets the direction of the current changed and set more to the northward at three-quarters of a mile in the hour.

The most copious description of these isles is that of Captain Amasa Delano, who' in the American ship *Perseverance*, from Boston toward Cape Horn, 23rd December' 1799, at 2 hours p.m., saw three small islands bearing W. by S 2 or 3 leagues distant. The vessel bore away, and at 3^h p.m. was abreast of them. Hoisted the small boat out, went on shore, and found them to be nothing more than a cluster of craggy rocks, about one-fourth of a mile in extent from North to South, and nearly as much from East to West. No sort of vegetation existed upon them. The rocks were found to be five in number, but only two of any considerable magnitude. Their greatest extent was from N.N.E. to S.S.W. The two largest nearly connect with each other and form a kind of harbour, or place of shelter for a boat, on the N.W. side. Here they managed to land, but obtained nothing excepting a number of boobies. On shore the aspect was most dreary, the sea roaring and surging on all sides. Two smaller rocks were lying off to the S.S.W. of the large ones, and one, very small, to the N.E. When on the highest part, which was 100 (70) feet above the surface of the sea, no dangers could be seen but what showed themselves above water, nor could any be discovered from the ship. Plenty of fish were caught in the harbour or basin. At 6^h p.m. returned on board. Sharks were numerous about the ship; but, in attempting to take them, a number of hooks and lines were lost, and several pair of grains broken. On sounding, within 2 miles of the islets, no ground could be found with a line of 200 fathoms.

Captain Delano states that the islets may be seen at the distance of 4 leagues, and always make like three sail when first seen. They are very dangerous if fallen in with by night. The current near them sets N.W. by N. true, 1 mile an hour. The parts above the reach of the surf are covered with birds' dung. The birds were hatching their young at the time. The month of November would be the season for procuring eggs at this place, as they may be obtained at that time in abundance; but, being the eggs of oceanic birds, they are rather fishy than sweet.

Captain FitzRoy, from his obseavations, places the summit of the Penedo in lat. 0° 55' 50", long. 29° 22'. The variation here, on the 16th of February, 1832, was 9½° West. Temperature of the air and water 82°. Wind S.E. The rocks were seen on the horizon at sunset of the 15th. They appeared extremely small at about 8 miles distant. At daylight next morning two boats were sent to land upon and examine them, while the *Beagle* sailed round, sounding and taking angles. Good observations were made during the day, as the sky was clear, and the water smooth.

The multitude of birds which covered the rocks was astonishing, and they suffered themselves to be kicked about and killed with sticks; at the same time, those on the wing even darkened the sky. While one party were scrambling over the rock, a determined struggle was going on in the water, between the boats' crews and the sharks. Numbers of fine fish, like the groupars (or garoupas) of the Bermuda Islands, bit eagerly at baited hooks put overboard by the men; but, so soon as a fish was caught, a rush of voracious sharks was made at him, and notwithstanding blows of oars and boat-hooks, the ravenous monsters could not be deterred from seizing and taking away more than half the fish that were hooked.

At short intervals the men beat the water with their oars, all round the boats, in order to drive away the sharks; and for a few minutes afterwards the groupars swarmed about the baited hooks, and were caught as fast as the lines could be hauled up; then another rush of sharks drove them away; those just caught were snatched off the hooks; and again the men were obliged to beat the water. When the boats returned, they were deeply laden with birds and fish, both welcome to those who had been living on salted provisions.

From the highest point of the rocks, which is 64 feet above the sea, no discoloured water, nor any breaking of the sea, could be discerned, apart from the place itself; and from the soundings taken in boats, as well as on board ship, I conclude that it is unconnected with any shoal, being merely the summit of a steep-sided mountain rising from the bottom of the ocean. A slight current was setting to the westward, not amounting to a mile an hour.—(Vol. II, p. 56.)

Lastly they were visited by Sir James Ross, with the *Erebus* and *Terror*, in his Antarctic expedition, November 28th, 1839. He has given a small chart of them, and the following:—" We found the steep north-eastern side of the cove the most practicable point for landing, and near it we obtained our observations. These remarkable rocks, which lie in lat. 0° 56′ N., long. 29° 20′ W., and more than 500 miles distant from any continent, appear to have been raised by volcanic agency, and not in any part exceeding 70 feet above its surface, and present the form of an oblong crater, the larger axis lying in a N.E. and S.W. direction." Mr. M'Cormick, the talented surgeon and naturalist to the expedition, gives also the following remarks: " They consist of a group of rocks scarcely exceeding half a mile in circumference. The four largest form a kind of bay on the N.W. side, in which there is considerable swell. The highest rock is on the N.E. side of the bay, rather sharply peaked, 70 feet above the sea. The next in height, and the most remarkable, from its uniform white colour, is 61 feet, and is on the S.W. or opposite side. This rock is a very hard kind of hornstone, covered with a thin layer of calcareous matter, evidently formed by the excrement of the birds."* Variation, November 28, 1839, 13° 20′ W.; dip, 27° 8′ N.

Sandré Rock (?)—A danger, which certainly must be placed among the doubtful, has been announced to the South of the Peñedo. It is necessary to give it, though the statement does not carry much conviction with it. " On December 30th, 1849, at 7^h p.m., the ship *Francois Casimir*, Captain Sandré, being in lat. 0° 14′ South, long. 29° 18′ West, perceived, at a cable's length off, on the port hand, a large black mass. The moon had not risen, and it was not certain whether this mass was a rock or a ship, but the commander doubted that it was a vessel, because up to sunset he had a man at the look-out, who saw no signs of such on the horizon. On the morrow they made the Peñedo, and found that the current had set them to the North.—Annales Hydrographiques, Tome III. p. 343.

3. FERNANDO NORONHA.

Fernando Noronha has been well placed on the charts for many years. Captain Cook, 1775, and Captain Foster, 1830, gave a near approximation to the position since more accurately determined by Admiral FitzRoy and Lieutenant Lee, U.S.N. The former place, Fort Conçeiçao, on the West side of Water Bay, in lat. 3° 50′ S. Captain Foster makes it 3° 49′ 59″ S. The longitude, according to Admiral FitzRoy, is 32° 25′ W.; Lieutenant Lee makes it 32° 24′ 48″ W., measuring from Pernambuco (Fort Picao, long. 24° 51′ 48″).

The island itself is about 6½ miles long W. by S. and E. by N., and two miles in breadth. To the eastward of it are several other smaller islets, the outermost of which is Wooding or Rat Island, 1⅓ mile long, separated by a narrow channel from Boobie's Island, and this again by a shallow passage from St. Michael's Mount, Vana, or Egg Island, and the Platform, all of which lie around the N.E. point of Fernando Noronha. To the N.W. of this and of the island is the Cloven or Split Rock, and at 1¼ mile from the East point is Water Bay, at the head of which is the village. Fort Conçeiçao is on the West side of the Bay, and the Citadel on the other.

The Pyramid, or Peak, is a rugged barren pinnacle, 800 feet high, which in some directions looks like a steeple. On its N.E. side are some horizontal basaltic columns.

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* Voyage to the Southern and Antarctic regions by Sir J. C. Ross, R.N., Vol. I. pp. 14—16.

From this peak to Placelliere, or S.W. point, is 4 miles. At 1⅓ mile are two small islets, called the Twins. A *sunken rock*, with 15 fathoms inside it, lies at a quarter of a mile off the extremity of the S.W. point, which is a norrow peninsula, having at its commencement a hole through the rock, called the Hole in the Wall, which being very conspicuous in some positions, is a useful mark. At 2⅓ miles from the S.W. point, on the South side of the island, is a small bay protected by two small islands, Mayor Island and Goelette, or Statue Island, from its resemblance to a statue. Tobacco or South Point, is a mile to the eastward, and has a reef of rocks awash stretching off it nearly half a mile to the southward. The remainder of the South coast is very irregular, and on the east side of the bay, to the East of Tobacco Point. is the highest hill on the island. At 1¼ mile off the East Point are two small islets called the Brothers.

A rocky patch, apparently the only outlying danger, lies at 2¼ miles S.E. by E. from Tobacco Point, with 10 to 15 fathoms between. The sea always breaks on it, and when on it the pyramid is shut in by the highest hill, on the South side.

On approaching the island no soundings will be found until very close in. There is no danger but what may be seen, excepting the rocky spot off the South side, between 2 and 3 miles from shore, and the rock at about a quarter of a mile from the S.W. point.

The road or principal anchorage is on the North side of the island, being sheltered by the north-eastern land, and several islets in that direction. The anchorage has from 10 to 12 fathoms, loose sandy ground, at about half a mile from the citadel point, or nearest shore. It is unsafe to lie in with northerly or N.W. winds, which are said to prevail from December to April; in the other months the winds are mostly from the S.E. or easterly, sometimes at N.E.

Water may be obtained here; but, in the dry season, it is sometimes very scarce. In seasons of drought, which are not uncommon, the rivulets are dried up, and the vegetation parched. There are but few vegetables, but plenty of live stock and fish, with an immense quantity of doves. The fresh water is obtained from a well near the Governor's house, in the cove called WATER BAY; but the cask must be rolled over some rocks, and swung off to the boat, over the impeding surf.

Wood is cut on the larger islet to the N.E., called WOODING or RAT ISLAND. This islet is nearly surrounded by rocks, and there is a risk of staving the boat when taking off the wood, as it is heavy, and sinks if thrown into the water. Should the governor permit wood to be cut on the main island, it may be conveyed without much danger from the fine sandy bays to the westward of the road.

On the 9th of April, 1827, H.M. ship *Cambridge*, Captain T. J. Mailing, touched here, and there were, at the time, about 200 inhabitants upon the island: of these 60 were soldiers, under the government of a Prussian officer, who, with the assistance of an engineer, was repairing the fortifications and erecting new points of defence. She anchored with Rat Island, bearing N.E. by E. ⅓ E.. St. Michael's Mount, partly shut in by the Platform E. ¼ N., and the citadel S.S.E. one mile, the Sugar-Loaf Hill S.S.W., and two small islands S.W. by W.

The current here commonly sets strongly to the westward, for which due allowance must be made in rounding the islands on the N.E.

On the 6th of June, 1830, Captain Foster, in H.M. ship *Chanticleer*, bade adieu to Ascension, and in six days came to an anchor off the village in the *Peak Bay* of Fernando Noronha.

Fernando Noronha was copiously described by Mr. Webster. The large island, he says, is still used by the Brasilians as a place of transportation for criminals, as well as for the exile of political delinquents. The beautiful scenery of this island is enchanting. The shore is scooped out by inlets, and embossed with green promontories, which are connected by circling beaches, where rippling waves chase each other over the silvery sands, and bathe the flowerets of the skirting woods. A fresh luxuriant verdure crowns the summits of the hills, blending its soft hue with the general contour of the island. A richness and variety of vegetation is seen everywhere, excepting on the colossal pyramid of naked rock, which, rising from the bosom of a grove, stands erect in barren ruggedness, towering majestically over the smiling and fruitful scenes around. It is a gigantic block, the summit being 800 feet above the level of the sea, and is an excellent mark for seamen.

The scenery throughout is all fertility and beauty. There are no romantic hills and dales, but everything is on a moderate scale, and pleasing to the eye. The vegetation is that of a thickly wooded grove, rather than that of the dense forest, for it admits of a walk even through its most shaded parts. There is an inland lake in the island, and one or two trifling brooks, but no permanent streams of any importance. In the wet seasons the island is one continued swamp and bog; while in the summer it is dry and arid, and occasionally altogether deficient of water.

Few of the trees are of sufficient magnitude to afford timber for many useful purposes, rarely exceeding 6 or 7 inches in diameter, and the largest a foot. The most common is the dark and laurelled *Bara*, which abounds with an acrid, caustic, milky juice, very much dreaded by the woodcutters, as it produces inflammation of the skin, and severe opthalmia. This tree is, therefore, regarded as a nuisance, inasmuch as it acts as a powerful depilatory; it removes the hair from the horses and cows, and gives them a diseased appearance.

The soil is a fine rich loam, of a considerable depth, and has a reddish tinge. There is upland pasture for sheep, and rich plains for cultivation, besides little fairy vales, blooming in all the beauty of verdure. The sandy beaches in the bays are sweetly picturesque, especially in the evening; the sand is as smooth as a well-rolled path, and the gentle ripple of the waves scarcely disturbs the tranquillity which reigns around.

The island is garrisoned by a small party of Brasilian soldiers, under the command of a major, who fills the office of governor. He has a few staff officers, and about 100 men. The islands are protected by several forts, which, if in good condition and well manned, would present a formidable means of defence.

A small village is seated on the shore of Peak Bay, built in the form of a square. The houses composing it are not worthy of note, but are sufficient for the place. A neat chapel stands on the hill over the village, which also boasts of a clean and comfortable hospital, and a respectable and commodious house for the governor. The other principal buildings consist of a set of barracks for the soldiers, a tank or large cistern for water, a bath, and a prison in which the culprits are safely lodged every night, after being allowed the liberty of ranging about the island by day. Most of the houses have gardens attached to them, and the governor has a farm at a short distance from the village, from whence his table is supplied.

At about a league from the village, in a S.E. direction toward Tobacco Bay, are extensive fields of Indian corn and cotton, besides a plantation of cocoa-nuts and a tolerable garden. A brick and tile manufactory is also carried on there, but there are no lime-kilns.

The employment of the people consists principally in fishing, for which purpose they have a manufactory of cotton line. Agriculture is much neglected, the greater part of the island being in a state of nature; but such is the richness of the soil that that it would repay them well for any trouble they would bestow on it.

The process of drawing the seine is very interesting. This consists of a few long stems of creeping convolvulus with the leaves on it, which are twisted together into a kind of mass or lump. Thus prepared, it is dragged into the water just within the break of the surf; and when a fish is seen within the scope of their leafy net, they drag it quickly ashore, with the view of entangling it among the leaves. This device is sometimes very successful. The cotton hand-nets that they also use are very neatly constructed; and with these they reap a much richer harvest. Whilst the operation of drawing the seine is going forward on the beach, some are occupied in angling from the rocks of the projecting points, and among them sufficient fish is caught for the provision of the whole islanders. Groups of naked fellows may be seen seated on the beach watching the operations of the fishermen; while the pelican is diving continually over the edge of the surf, and the man-of-war bird over him, who, as the pelican rises with his prey, darts down on him with incredible rapidity, and makes him instantly disgorge it, when it is instantly seized by this second plunderer.

The attempts of these islanders at navigation are confined to the Catamaran, not a single boat being found throughout the whole island. All ideas of improvement on anything are foreign to their minds; the accoutrements of their horses are the same as those used more than a century back; and as for agriculture, they have no idea of it. The ground lies untilled before them, the earth smiles in vain, while they are ever lolling in their hammocks, smoking and gaming throughout the day, the very patterns of indolence and laziness. The evenings are passed in serenading to the notes of a guitar, or singing and revelling at some lascivious fandango. The only art for which Fernando is famous is that of rearing capons, which are of the finest description.

The island is supplied with flour and other provisions from Brasil; but the supplies are, at times, deficient. When the *Chanticleer* was here, in 1830, the governor was very glad to exchange his fresh beef for flour and biscuits. The cattle of the island are very fine, and an abundant supply of good young beef was obtained. The governor was exceedingly attentive, and sent off every morning sufficient milk for the men as well as officers. Vegetables were rather scarce, although they might be raised in any quantity. Rat Island yields a profusion of fine melons. The water melons are particularly so, and sometimes 2 feet long.

During the stay of the *Chanticleer*, from the 12th of June to the 18th of July, the officers were kindly accommodated and most hospitably entertained by the governor and several families on the island.*

Admiral FitzRoy visited this island in 1832: he says,—"Before sunset, on the 19th February, we saw the island of Fernando Noronha, with its singular peak towering aloft, and at midnight anchored in the roadstead.

"Next morning I landed with difficulty, for observations, the surf being so high that any common boat would have been swamped. By taking great care, our broad and well-built whale-boats landed the instruments and a small party, and re-embarked them afterwards, without accident.

"We landed in a small bay under the so-called citadel; but there is a safer and in every way preferable landing-place about a mile to the northward. My object being chiefly to take sights of the sun, for time, and compare the chronometers used on shore as soon as possible with those on board, I preferred landing as near as I could to the place where the lamented Captain Foster observed; but it was difficult to ascertain the house in which his pendulum observations were made. Not even the governor could tell me, for he had arrived since Captain Forster's departure; and most of the inhabitants of the island had changed their dwellings frequently, being all exiled convicts from Brasil.

"The governor was a major in the Brasilian service, born at Pernambuco, and under his command were 200 black troops, and about 800 human beings, only 30 of whom were women, and a very few children.

"We obtained some firewood from some of the islets northward of the principal island; but it was full of centipedes and other noxious insects, from which it was not easy to free it, even by charring and washing; water we did not try to get, because of the heavy surf, but there is no scarcity of it on the island. Neither live stock nor vegetables could be procured from the apathetic inhabitants.

"This place is rather picturesque; and the lofty barren peak, already mentioned, is conspicuous from every point of view. Near the summit is a station from which a look-out is kept, not only over all the island, but over many leagues of the surrounding sea; so that neither ship nor boat can approach or depart, during daylight, without being noticed.

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* See, more at large, Mr. Webster's Narrative, Vol. II. pp. 14—27.

"No boats are allowed to be kept on the island, and no intercourse is held with shipping without permission, and the strictest inspection."—*Narrative*, &c., Vol. II., page 58.

The climate of these isles has been described in page 55. For the phenomenon called the *Rollers*, which occasionally prevails here, see page 117.

4. THE ROCAS.

This low coral reef is perhaps the most formidable danger in the Atlantic. It is the only one of its character in that ocean—a true atoll, isolated from all surrounding lands, so many of which are found in the Pacific. It is, moreover, more redoubtable from its position, lying in the midst of strong, and at times of devious currents, in what has become of late years a great highway across the equator, it has had very much attention paid to it.

It is also necessary to allude to a singular error in its position, which has been perpetuated nearly till the present time, and which must have led to much embarrassment, and probably loss and danger. Yet the apathy of the seaman is exemplified in this, that among the thousands who must have passed it, and suspected the error, not one should have thought it worth while to question the accuracy.

The very dangerous group was examined, and their position accurately ascertained, by M. Lartigue, under the Baron Roussin, in 1825. Yet from an erroneous estimate in Horsburgh's Directory, the *first* edition, in 1809, they are placed in longitude 33° 31′ W., or from *fifteen* to *eighteen miles too far East.* This error was continued in all the editions of Horsburgh down to that of 1855, and has doubtless misled many. It was first pointed out by Lieut. Lee, U.S.N., who visited it in the U.S.S. *Dolphin*, in April, 1852.

The position finally assigned to the reef is very nearly as in the table, page 3, and note 2, page 7.

Lietenant Lee's longitude connected with Fernando Noronha, with a four days' interval would make the North end of Sand Island in long. 33° 49′ 14″ W., lat. 3° 50′ 56″ S.

Captain Parish places the centre of Grass Island in 3° 51′ 25″, long. 33° 46′ 33″.

Captain Selwyn says it is 3° 51′ 30″ S., long. 33° 50′ 9″ W.

The mean of these last is 33° 48′ 39″, which agrees nearly with Lartigue, may be taken as taken as very near the truth, considering that Bahia and Pernambuco are settled as in the table on page 13, and notes 2, 3, page 17,

The Rocas have been the scene of many sad wrecks. A fleet of Indiamen and others had a narrow escape in November, 1805, when the *Britannia* and *King George* were wrecked. Several occurred subsequently, of which no particulars are known, beyond the existence of the remains which were found on them by later wrecked and other visitors. In October, 1855, the *Countess of Zetland* was lost here. In October, 1856, the *E. D.* was wrecked, a portion of the crew escaping after much suffering. Lastly, on October 7th, 1865, a fine ship, the *Duncan Dunbar*, was totally lost on it. (It is singular that all these wrecks should have occurred at the same time of year.) This last disaster was the subject of a judicial investigation at home, which exonerated Captain Swanson, her commander. Much controversy subsequently arose.

The *Currents* in the vicinity of the Rocas are very powerful. It lies in the strength of the great southern branch of the equatorial current, described on pages 99, 100, which sets strongly to the *westward*, but certainly not invariably in that direction, and with very changeable rate. It is stated to run westward 1¼ knots per hour, 36 miles per day. Undoubtedly this velocity is frequently attained, but it is very much less than this as a mean. In the months of September and October it is about 16·5 miles per day. From a mean of about fifty observations in their immediate vicinity throughout the year it is about 19·8 miles per day. But this rate is in varied directions. It frequently ceases altogether, or is almost inappreciable. It is found running to the South and S.E. as well as to the northward, and Admiral Roussin mentions a special case of his own experience, when he was drifted 350 miles to the *eastward*, in what is usually considered to be the strength of the equatorial current, at a few degrees to the eastward on the same parallel.

Under these circumstances it behoves every commander to be specially on his guard when in their neigbourhood, especially by night, for then the only visible sign of its existence will be the breakers on its edges.

We will give extracts from the descriptions in the order in which it has been visited.

Lieutenant Lee, who surveyed it in April, 1852, gives the following description of it:—

The centre of this low and dangerous reef is in lat. 3° 51′ 27″ S., long. 33° 48′ 57″, and is 84 miles due West of the peak of Fernando Noronha. The reef extends about 1¼ mile in latitude, and nearly 1¾ mile in longitude, and is covered at high water, with the exception of Grass and Sand Islands on the West, and the scattered rocks on the South and East sides. These objects are from 10 to 15 feet above the reef, which is formed of coral, generally level, though with many holes in it. In case of a vessel striking on the weather side of it (S.E.), the chance of saving life would be but small. When about 10 miles off, the breakers were first seen from aloft. Then the two low islands and the black rock soon appear. Sea birds abound, but there is no guano owing to the rains. The eggs of the gulls were plentiful and good (March, 1851.) There is no wood nor fresh water. There is bad anchorage from one or two miles north-west of Sand Island, in from 15 to 18 fathoms coral bottom. We found coral bottom at 15 fathoms 6 miles East of the reef, but no bottom at 30 fathoms 2⅛ miles N.N.E., nor at 70 fathoms 4 miles S.E. of it.

The tide rises about 5 feet. The lagoon, in which we saw many turtle, has from 1 to 4 feet water at low tide, and shows white from the mast head at 4 or 5 miles distance. The anchors and cable on the S.W. part of the reef, and the remains of a wrecked vessel on the N.E. side of Grass Island, appear to have been on the reef for a long time. A lighthouse on the reef would be very useful to vessels.

The *current* in the vicinity of this reef sets from between S.E. by East, and East by North, at the rate of from ⅞ to 1⅛ mile per hour, as found by the patent log. The surface current found by trials on 4 different days, sets from between S.E. and East by North, from ⅞ to 1⅜ mile per hour. At the anchorage under the lee of Sandy Island, the tide ran from ¼ to ⅞ knot per hour, setting from between S.S.E. and East by North toward the northward and westward.*

Lieut. Lee saw the remains of many wrecks on various parts of the banks, and a hut on the western edge; numerous cotton bales lie scattered about. A bank carrying 14 or 15 fathoms affords anchorage as far as 5 miles to the N.E. of the banks. Lieut. Lee planted some cocoa-nut trees on the eastern sand-bank, which would afford a useful mark if they grow.

Commander Parish next visited it. The following is his report:—

"On the 5th of March, 1856, I sighted the Rocas from the mast-head at 4^h 15^m p.m., bearing W.N.W., about 9 miles distant, at which time we had no bottom with 46 fathoms. I then bore up N.W. to close the group, and on sounding at 5^h p.m. obtained coral bottom in 13 fathoms, the rocks not being even then in sight from the deck. I therefore determined on remaining in that position during the night, and consequently anchored in 12 fathoms, the highest rock being then first visible from the deck, bearing West (*true*).

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* Cruise of the U.S. brig *Dolphin*, p. 82.

"At 6h 40m a.m. the next day I proceeded under steam to the N.W., giving the shore a berth of about 5 miles, until arriving on the N.W. side of the sand-banks, where I anchored in 20 fathoms, coral bottom, at about 2½ miles from the shore, with the following *magnetic* bearings (variation 10° W.): breakers, southern extreme, S. 15° E.; middle of sand-banks, S. 27° E; highest rock of group, S. 42° E.; breakers, eastern extreme, S. 50° E.

"Whilst describing the semicircle, our soundings were 13, 14, and 15 fathoms, until the group bore S. by E., when there was no bottom with 70 fathoms. From this it appears that the shoalest water exists on the eastern side. A careful attention to the deep-sea lead would alone betray to a vessel in doubt the vicinity of the shoal on approaching in that direction, when, if practicable, anchoring is a course strongly to be recommended, until daylight or clearer weather enables the master to ascertain his true position.

"As the prevailing winds in that quarter will always enable a vessel bound North to choose a course either to the East or West of this shoal, I do not see that any master would be justified in endeavouring to sight the same; a proceeding which might be attended with considerable danger, and the benefits to be derived from which I am a loss to conceive.

"Having landed on the eastern sand-bank, I caused a number of cocoa-nuts to be planted thereon, which were furnished me by H.M. Consul at Pernambuco, with the view of their forming, in time, distinct land-marks, which will enable the place to be discerned at a much further distance than is now possible.

"The highest part of the bank may be set down at about 10 feet above high-water mark. Rise and fall of tide, 7 feet. We found the current to set W.N.W. (*true*), between 1 and 2 miles per hour."

It appears probable, from the observations of Commander Parish, that a bank of soundings extends from the Rocas in a N.E. direction to the distance of about 5 miles. Upon this bank the depth obtained was 14 and 15 fathoms. It is strongly recommended to make a frequent use of the lead when approaching the reef, and to have an anchor and cable ready for letting go, should occasion render it necessary.

Captain J. H. Selwyn, R.N., re-surveyed the island in H.M.S. *Siren*, November, 1857, and gives the following observations:—

"It is a perfect coral island, circular, about 2 miles in diameter, and has in its centre a shallow lake, with an opening to the sea. The greater part of the reef is under water. There are two sand-banks, one on the south-west side, and the other on the north-west side of the island. These are 10 or 12 feet above water at all tides, and are 200 or 300 yards long. The smaller has on it some stunted vegetation and hazel trees. A tower 33 feet high, has been erected on the larger bank, which can be seen in good weather a distance of about 11 miles. The island lies in a strong westwardly current, varying from 1 to 2 miles an hour."

Captain H. Toynbee passed them in the *Gloriana*, in October, 1838, and published the following useful remarks in the "Nautical Magazine," October, 1859:—

"Throughout the afternoon (October 19th), we steered about S. 35° W., and at 5h p.m. we saw the reef about 12 miles off, extending from nearly right ahead out on the weather bow; and at 6h we kept away W.S.W., so as to pass it at the distance of about 5 miles.

"The sighting the Rocas was one of very many instances in my experience proving the look-out man, either from want of practice or from want of feeling an interest in what he was doing, unable to see an object almost staring him in the face. From 3h 30m p.m. I ordered a regular look-out from fore-topsail-yard, and at 5h p.m. felt so sure that the reef must be in sight that I determined to visit the topsail-yard myself; when on stepping into the rigging something strange caught my eye, which proved to be a beacon on the western part of the reef: yet from the topsail-yard the look-out man had seen nothing, and could hardly see it when I pointed it out. A similar case happened one evening on our way towards Torres Straits, when I sent an officer up to look round as the sun set, though I always kept a man on the fore-topsail yard. He quickly saw a long line of broken water right ahead, it being part of Lihou shoal, extending further to the eastward than it was laid down either in charts or books. I find that in moderately clear weather, when observations show that the land may be sighted, a good night-glass on the fore-castle and a patent lead are first-rate safeguards; indeed the three L's are all right enough, but much depends on the quality of these said L's.

"From the fore-topsail-yard, with a first-rate Dollond, I examined the reef carefully. It reminded me of Wreck Reef and others in Torres Straits in the usual characteristics of a fringe of rocks sticking above water all round it, and lagoons of beautifully green water inside the fringe. There were loose pieces of rock lying in different parts, apparently thrown up by the sea, one larger than the rest on the eastern end of the reef; and on the western was the highest patch of sand: it was very white, though partly covered by something looking like brownish grass, and *there* was placed the beacon. I saw no signs of the cocoa-nut trees planted by Commander Parish, of H.M.S. *Sharpshooter*.

"From this bird's-eye view I think that the whole reef was fringed with rocks above water, with no passage even for a boat between the patches of sand. There were large numbers of birds settling on the island, and as the evening advanced we passed several which were steering a straight course for it. This, as has frequently been remarked before, is a capital sign for pointing out land, for the booby and some other sea birds will, if possible, find a resting place for the night, even though it should only be a ship's yard-arm; when some mischievous boy is sure to disturb his dreams, of which he makes everybody in the ship aware by his loud screaming as he is carelessly carried down the rigging by the neck.

"7h p.m.—As we passed the reef, the white sand island on the western end bearing E. by S. at a distance of about 5 miles, we hove the lead and had no ground with 43 fathoms up and down. A plan of the reef would be very useful. There being a good moon and clear horizon, I found our position very frequently, in order to detect the first signs of the strong westerly current which some ships have experienced in this part of the sea."

The last notice we shall quote is that arising out of the unfortunate loss of the *Duncan Dunbar* before mentioned:—On Oct. 7, 1865, Captain Swanson, her commander, observed her position at noon, and laid his course to pass 12 or 15 miles to eastward of the Rocas, allowing for the current as 1¼ mile per hour to the westward. At 8.30 p.m. she struck on an outlying patch on the N.W. side of the isles, and became a total wreck. The ordinary westerly drift had evidently ceased, and a not unfrequent slight southerly and easterly one had taken its place, and thus caused the disaster. The passengers and crew (117 in number) escaped to the Sand Island, and were fortunately all rescued on October 17th.

"In the chart of this reef a beacon, called there the Syren Beacon, was marked as being on the bank or islet on which we landed, and 30 feet above high-water mark, and seven cocoa-nut trees as being on the other islet or bank. This beacon is no longer in existence, having fallen, and the seven cocoa-nut trees have disappeared, there being only three very young, growing cocoa-nut trees, about four feet high. It is not impossible that at high spring tides, with a northerly or north-westerly wind, the water would rise to the level of the islet on which we took refuge, if not somewhat above it."

What has been said will suffice to put the mariner on his guard when in the vicinity of this dangerous spot, which lies about 125 miles off the N.E. extremity of the Brasilian coast about Cape San Roque and Point Toiro.

Lieut. Lee, U.S.N. brig *Dolphin*, says:—We were three days (March 29—31, 1852) within from 20 to 30 miles North of the flats, of S. Roque, off Cape Toiro, when the N.E. and S.E. trades seem to meet and form a region of calm and rains, with an oppressive atmosphere resembling that of the equatorial calms. Outside of this region our track shows that the S.E. trades, though light, generally prevailed between the Rocas and the main to within a degree of Point Toiro, and that when we were a degree and a half North of this cape, and in the parallel of the Rocas, the light variable winds, leaving the S.E. quadrant, came out to the eastward, soon got northing on them, and turned into gentle N.E. trades in 2° S. The direction of the winds around this cape, outside the influence of the land-breeze, and also outside of the belt of calms and rains, appears to be modified by the form of the continent. They come from the southward and eastward upon the eastern shore, which bends to the northward; whilst around the elbow of the cape they draw more easterly (interrupted at this season, when the sun is near the equinox and going North, by small squalls of wind and rain from all around the compass), and on the northern coast, which trends to the westward, they come from the N.E.

The *current* between the Rocas and the main sets generally from the southward and eastward, from 1 to 1¼ knot, until near the flats, where we experienced indications of a counter current or tide. Learned at Para that their coasting vessels were generally four weeks going from there to Pernambuco. It is more from the failing of the wind there than from the current, that it is so difficult to double Cape San Roque.

CAPE SAN ROQUE, in lat. 5° 25′ 20″ S., long. 35° 17′ 30″ W., is considered as the turning point of the Brasilian coast. It has been surveyed by Lieut. Vital de Oliveira, of the Brasilian navy, in 1859, and these charts give us a fair knowledge of this important landfall. The *Shoals of San Roque* extend between the Cape and Toiro or Touro Point, 23 miles to the N.W., at a distance of from 6 to 8 miles off shore, the outer edge being in some places awash. The N.W. point is 9 miles N.N.E. from Point Toiro, and the S.E. end 4¼ miles E. by N. from Cape San Roque. There are several channels through this outer line of reefs, and within it is a channel of 3½ to 5 fathoms throughout, except a *bar* of 13 to 14 feet midway between Cape San Roque and Point Toiro. The charts will show the peculiarities of this important point, and they are described in a subsequent part of this work.

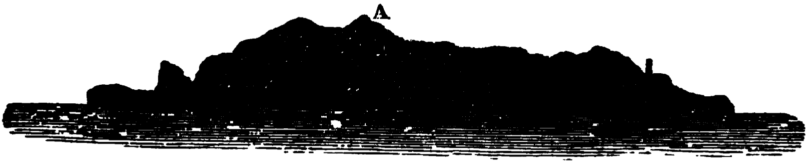
5. MANOEL LUIS SHOAL, OFF MARANHAM.

This dangerous reef lies in 0° 52′ 10″ S., long. 44° 12′ to 44° 14′ W. It had long been known to exist, but its exact situation was not ascertained until 1820, when it was found by the Baron Roussin of the French navy, who is said to have had a very narrow escape when searching for it.

The reef, which lies 0° 1′ 30″ East of St. Luis, or Maranham, is "more than half a mile across from North to South, but not less than 3 miles in an E. by S. and W. by N. direction, and is formed by a cluster of conical rocks, whose heads are just beneath the surface of low tides, having small openings of deep water (8 to 10 and 17 fathoms) between them, which renders it the more dangerous; as in case of striking thereon, a vessel would, most probably, go down immediately." A more copious description of this shoal is given hereafter, in the Directions for Maranham, &c.

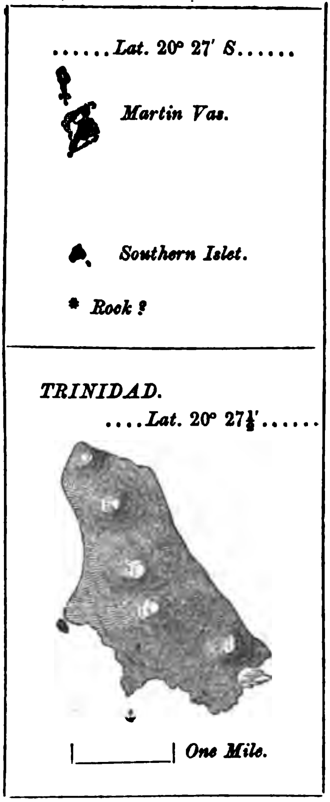
6. ISLET OF TRINIDAD, MARTIN VAS ROCKS, ETC.

The little island of Trinidad has been correctly placed on our charts, by the survey



Trinidad; the point A *bearing W. 7° N. true, or W.N.W. ¾ W. by compass, 4½ miles distant.*

of M. Bérard, an officer of the *La Coquille*, commanded by Captain Duperrey, in Oct. 1822. A copy of his survey of this and the adjoining Martin Vas Rocks is annexed. The S.E. point of Trinidad is in lat. 20° 29′ 55″ W. The longitude of the S.E. point, according to Comm. Owen, is 29° 21′ 42″.



In approaching Trinidad from the eastward, when running on its parallel, you will make the three islets or rocks of *Martin Vas*, which may be seen at the distance of 8 or 9 leagues from a ship's deck. These rocks are very remarkable, and cannot be mistaken; they lie North and South from each other, the distance from the outer rock being about 3 miles. The central rock is very high, with tufts of withered grass scattered over its surface; the other two are entirely barren. There is a passage between the southernmost and central rocks. The northernmost almost join. In clear weather Trinidad is distinctly seen from the rocks of Martin Vas, and may be descried 16 leagues off.

This island is about 6 miles in circumference, the land very unequal, and at best no more than a cluster of rocks, with some shrubs in the valleys. Its highest point, according to Captain Trollope, is 2,020 feet above the sea. The northermost side is quite barren, but to the southward all the interstices of the rocks are filled with evergreens of several kinds; there is also a quantity of sea fowl and rock fish, and many wild hogs.* The generality of the wood is very small, though there are trees of 18 inches diameter toward the extreme heights.

Trinidad is surrounded by sharp rugged coral rocks, with an almost continual surge breaking on every part, which renders the landing often precarious, and watering frequently impracticable; nor is there a possibility of rendering either certain, for the surf is often incredibly great, and has been seen during a gale at S.W. to break over a bluff which is 200 feet high.

The island is supplied with very good water from two small streams down the East and S.W. sides of it, besides a small issue from the rock which forms the S.W. extremity; not one of them will fill a tube of 6 inches in diameter, and there is a doubt whether these runs are temporary or perennial, though they always produce a small quantity of water sufficient to preserve the existence of a few wretched inhabitants. Lieutenant Thomas Hamilton, from whose account the detail of Trinidad is chiefly extracted, speaking of the anchorage, says that they anchored off the West side of the island, at a mile from the shore, to be able to weather it on any tack should the wind happen to blow on, "being directed," continues that gentleman, "to do so by Captain D'Auvergne, who informed us of the wreck of the *Rattlesnake* and the miraculous escape of the *Jupiter* and *Mercury*." They prudently avoided the common anchorage, which is about a musket shot from the shore, in 18 or 20 fathoms of water. On that side there stands a stupendous arch or hole in the rock, like that of Fernando Noronha, and two very remarkable rocks, one called the Monument and the other the Sugarloaf.

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* Captain Edmund Halley, of the Paramore Pink, afterwards Dr. Halley, Astronomer Royal, landed on this island 17th April, 1700, and put on it some goats and hogs for breed, as also a pair of Guinea fowl, which he carried from St. Helena. "I took (says his journal) possession of the island in His Majesty's name, as knowing it to be granted by the King's Letters Patent, leaving the Union Flag flying." When the English went to Trinidad in 1781, in order to ascertain whether a settlement was practicable there, they did not find it, after a survey of two months, to answer their expectations. Commodore Johnstone planted various roots on the different heights, but they all perished in a short time for want of water.

The Monument is 850 feet high, of a cylindrical form, and almost detached from the island, with large trees growing on its top. This had been named, in 1700, by Dr. Halley, the *Ninepin.*[*] The Sugarloaf, at the S.E. end, is 1,160 feet high, of a conical form, with trees likewise on its summit, and, whenever it rains hard, a cascade of above 700 feet makes there a beautiful appearance. The arch is a natural passage, made by the sea through a bluff about 800 feet high; it is 40 feet in breadth, nearly 50 feet in height, and 420 in length; the depth of water above 3 fathoms. When the sea is moderate, you may see through this arch into the only bay in the island, and have a view of a distant rock covered with trees, which renders the prospect extremely picturesque.

Lieutenant Hamilton says, "We first saw the island on the 5th of June, on our passage to the Cape of Good Hope; we had then variable winds and calms; and on making it a second time, the 8th of November, we had exactly the same winds and weather, accompanied by a heavy squall of wind from the westward. During our stay there, above two months, the prevailing wind was from N.N.E.; hence I conclude the S.E. trade wind is not to be depended on, although the island is so far within the Tropic of Capricorn."

The American commander Amasa Delano visited Trinidad in 1803, and he again describes it as mostly a barren rough pile of rocky mountains. What soil there is on the island he found on the eastern side, where there are several sand beaches, above one of which the Portuguese *had* a settlement, and have, he says, done much work in making streets or roads over the valleys, levelling down small hills to make the roads good. They had walled in a number of inclosures for the purpose of making fields, at the expense of much labour. "This settlement was directly above the most northerly sand-beach on the East side of the island, and has the best stream of water on the island running through it. It might be possible (he adds), in pleasant weather, to get it off from this place, but we get ours off the South side from the next best watering place or stream. This falls in a cascade over rocks some way up the mountains, so that it can be seen from a boat when passing it. After you have discovered the stream, you can land on a point of rocks just to the westward of the watering place, and from thence may walk past it, and when a little to the eastward of the stream there is a small cove between the rocks where you may float your casks off.

"Wood may be cut on the mountain just above the first landing-place, and you can take it off if you have a small oak boat. The method in which we filled our water-casks was carrying it in kegs and buckets to the place where we floated our casks on shore.

"All the South side of the island is indented with small bays; but the whole is so iron-bound a shore, and such a swell surging against it, that it is almost impossible to land a boat without great danger of staving it. The South part is a very remarkable high square bluff head, and is very large. There is a sand beach to the westward of this head, but I should caution against landing on the beach till it is well examined; for just at the lower edge of the beach, and amongst the breakers, it is full of rocks, which are not seen until you are amongst them. Where we landed we saw the remains of at least two or three boats which had been knocked to pieces by landing. We found plenty of goats and hogs. The latter were very shy, but we killed some of them and a number of goats. We saw some cats; and these three sorts of quadrupeds were the only animals we saw on the island.

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[*] A view of it is given on the first page of Sir James Ross's interesting narrative of his Antarctic expedition.

"If a ship is very much in want of wood or water, it may be got at Trinidad: or if the crew should have the scurvy, it is an excellent place to recruit them in, as you can get plenty of greens on the S.E. part of the island, such as fine purslain and several other kinds. These, together with the fine sweet water, would soon recruit a crew.

"A ship must never be anchored at this place with common cables, or she will be likely to lose her anchors; but if she has chains for her anchors, the rocks cannot cut them. The navigation is safe for a ship all round the island within the distance of a mile. *Martin Vas Rocks*, or more properly islets, lie about East, 9 leagues distant, but there do not appear to be any dangers between them and Trinidad."

Commodore Owen, in H.M.S. *Leven*, made Trinidad on the 25th of April, 1822; and he says that Trinidad, excepting the S.E. bay, appeared like a mass of rocks. The Ninepin, on the western side of the island, appears to be a basaltic column, and is very remarkable from a slight inclination in its position, which makes it look from certain points as if about to fall. A few stumps of euphorbia and some other shrubs were scattered over its otherwise barren surface: the vicinity of S.E. Bay alone bearing an appearance of fertility.

MARTIN VAS ROCKS.—These rocks, as before noticed, are high and barren. The central one is the largest, about 300 feet high, and it may be seen, from a ship's deck, at the distance of 25 miles. When bearing South the rocks seem nearly in a line. The northern and central rocks are near each other, but between the central and southern rocks is a good channel. Here the *Chesterfield*, in 1800, observed the latitude 20° 28′. When through, she hove-to in 12 fathoms, with the largest rock E.N.E. about a mile, the bottom then visible, and caught plenty of rock cod and other fish: the boat, in sounding, found the depth decrease gradually, over a rocky bottom, to 1⅛ fathom close to the largest rock.

The North rock is small, and most westerly: all are steep and inaccessible. The distance between the extremes is about 3 miles.

According to M. Bérard, whose survey is given on p. 187, the largest islet is in lat. 20° 27′ 40″ S., long. 28° 52′ 38.″ This position has been confirmed by Captain H. A. Van Karnebeek, of the Netherlandish frigate *Prins Hendrik*, who makes its longitude 28° 52′ 45″ W. Hence the true bearing from Trinidad is W. 4° S. (or W. ⅛ N. by compass), and the distance is 26 miles.

SUNKEN ROCK near MARTIN VAS.—From a Dutch work,* we give the following:—Mr. Menkman, captain of the merchant ship *de Amstel*, has given information relative to an hitherto unknown sunken rock, near the Martin Vas Rocks as follows:—

"In the forenoon of the 11th of May, 1842, at 10^h, we saw the Martin Vas Rocks in the S.S.W.; at 12^h they bore S.W. by W., distant from us 12 miles.

"In the afternoon, at 2^h 30^m, they bore South, 2 miles distant, and we discovered a *sunken rock*, a short mile S.W. from the said rocks. Var., 6° West.

7. ABROLHOS OR BRASIL BANKS.

Between the parallels of 16° and 22° S., and between long. 30° W. and the coast, there is an extensive bank, or rather collection of banks, with deep water between them, the number and nature of which we as yet know very imperfectly. The Abrolhos Islets occupy a central position among these coralline shelves, and have been well surveyed. So also have two patches, now placed on the charts, under the name of the *Victoria* and *Hotspur Banks*, from the surveys of Captain Denham, in H.M.S. *Herald*, in 1852. But each of these had been before known and partially explored, as will be presently seen. These, then, are well determined; but of others enumerated here, the positions and extent must be left for future examination and consideration.

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* "Verhandeligen enz. betrekkelijk het Zeewezen en de Zeevaartkunde," door G. A. Tindal en Jacob Swart, Amsterdam, 1843.

Commencing with the northward, the ships *Royal Charlotte*, *Brunswick*, and *Glatton*, in June, 1803, when in lat. 16° 0′ S., long. 37° 48′ W., had soundings in 22 and 25 fathoms, and thence gradually deepening from S.S.E. to S.E. 15 miles, to 60 fathoms. This may be the edge of the off shore soundings, as the *David Scott*, in June, 1810, in lat. 16° 35′ S., long. 38° 26′ W., had from 19 to 24 fathoms, the coast in sight bearing W.S.W., distant about 17 leagues.

The next portion is a patch of from 31 to 70 fathoms, coarse sand and coral, lying in about 16° 50′ S., long. 36° 10′ W.

The *Hotspur Bank*, presently described, is 1° to the South of this. In June, 1792, the *Busbridge*, when in lat. 18° 35′ S., long. 35° 54′ W., by chronometer, and 35° 56′ by lunars, had soundings in 30, 32, and 33 fathoms coral rock. The next to the southward is a shoal, marked on the chart, of 30 to 73 fathoms, in lat. 20° 15′ S., long. 36° 25′ W. To the West of this is the *Victoria Bank*, presently described.* In lat. 31° 56′ S., long. 38° 56′ W., some discoloured water was seen by the *Zephyr*, as shown on the chart; and at 1° West of this is the sounding obtained by H.M.S. *Pilot* in 1843.

All these banks have more or less of one characteristic, that of having a hard coralline crust, and also of being very steep-to. The depths between them have not been ascertained, but exceed from 160 to 250 fathoms. As they might be serviceable in approaching this coast, as a means of verifying the positions, or indicating the proximity of the continent, it is much to be desired that a more complete knowledge of their extent, number, and character were recorded.

HOTSPUR BANK.—The existence of this bank, one of the number before alluded to, was first determined by a sounding of 47 fathoms in the *Hotspur* in 1814. Captain H. M. Denham, in command of H.M.SS. *Herald* and *Torch* steamer, on their way to the Feejee Islands. in October, 1852, examined and determined its extent. "I shaped a course that should test this single sounding of 47 fathoms; and obtaining quicker soundings as we approached the assigned position of the *Hotspur*, our casts jumped suddenly from 200 fathoms, no bottom, to 27 fathoms coral; which, being 7 miles in advance of the 47 fathom spot, at once gave rise to an idea that the bank might cover a considerable space with perhaps shoaler water. No time was lost in taking up an anchorage upon it. The atmosphere favoured our morning, noon, and evening observations, so that latitude and longitude were satisfactorily obtained. It blew sufficiently moderate from N.E. to detach the boats, and before the swell disturbed us, we obtained sufficient to show that we had anchored upon a steep-to bank of coralline crust, extending 14 miles N.W. and S.E., and 10 miles in a N.E. and S.W. direction, with as little as 25 fathoms on the middle of it, and which deepened suddenly from 30 fathoms to 70 and 200 fathoms, without bottom. We could not detect the slightest current nor discolouration that would indicate so abrupt a feature in ocean water, by ripple or otherwise. The lead brought up a few specimens, but the dredge and anchor brought up nothing, and the fishing lines were very successful. We determined the latitude of the N.W. extreme of this bank to be 17° 51′ 30″ S., and the longitude, with the subsequent rates at Rio, 36° 5′ 9″ W., and the variation 6° 33′ W."

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* An island distinguished by name of *Ascensao* or *Portuguese Ascension* has formerly been described, and said to lie at the distance of about 100 leagues to the westward of the Isle of Trinidad. Doubts were long since entertained as to its existence, and they may now be considered as verified.

La Perouse, in 1785, sought for it without success, as far as the longitude of 7° West of Trinidad; and M. Krusenstern, in 1803, prosecuted the search so much farther to the westward that its non-existence within 37° West appears certain. Add to this that the governor of St. Catherine's informed M. Perouse that the governor-general of Brasil had despatched a vessel in the preceding year to survey the island, but that it could not be found, and it had consequently been expunged from the charts.

Notwithstanding this, it has been said that land was seen by the commander of the *Telica* steamer, on her passage to Peru, in 1825, which *appeared* to lie in lat. 20° 25′, and long. 37° 8′, or nearly so. At noon the vessel was in or about 20° 20′ S., and long. 37° 28′. The island bore S.E. by E. ¼ E. by compass, distant, by estimation, about 8 leagues. There can be but little doubt of the error, as an island visible at such a distance, must have been frequently seen, but the spot indicated is near to the East end of the Victoria Bank, and it is possible that it may have formerly been nearer the surface.

VICTORIA BANK.—For a knowledge of the extent of this bank we are also indebted to Captain Denham. Its existence was first made known by the *Montague*, in 1813. A portion of it had been sounded by Commodore Sinclair, in the U.S. frigate *Congress*, in 1817, as related in Brackenridge's account of the voyage: the depths there found were 35 fathoms, and they were lost in lat. 20° 30′ S., long. 37° 30′ W. It was therefore called the *Congress Bank*. In August, 1849, the U.S. ship *John Adams*, explored its S.E. position.* Captain Denham's remarks, continued from the previous description, are as follow:—

Pursuing our search for the Montague Shoal, at 9 miles farther eastward than it was reported, we struck it in 31 fathoms, from a long line of 180, with the deep sea lead, and no bottom. We were forty-eight hours buffeting with a south-easter before we could obtain an anchor hold of this bank, to which my attention had been especially directed. Eventually we occupied three positions on it; the *Torch* joined us, and we soon traced out a tolerably flat bank of 35 fathoms, bending to the South, in its general direction from N.W. to N.E., 72 miles in length, and 12 in breadth, with one spot at its N.E. extreme of only 19 fathoms. We found a current to the S.W. of three-quarters of a mile per hour. The same description of fish as on the Hotspur were found in abundance. The swabs which we let down on it from different parts of the ships entangled some massive specimens, while the crusted surface would yield nothing to the dredge or palm of the anchor. Our observations on this bank place it in lat. 20° 45′ 8′ S., long. 37° 47 33″ W. The variation (also adjusted for change of subsequently ascertained deviation) came out 3° 43′ W.*

The French frigate, *Belle Poule*, in March, 1843, tried for soundings at 30 leagues to the East of the assigned position of Congress Bank, commencing in lat. 20° 25′ S., long. 35° 49′ W., and terminating in lat. 20° 33′ S., long. 35° 58′. She found from 18 to 20 fathoms, coral bottom. Although there is thus a difference of nearly 90 miles in the longitude and that stated for the Congress Bank, it is possible that they may be the same. The longitude of the *Belle Poule* may be taken as near the truth.

The PILOT BANK.—H.M.S. *Pilot*, Captain Jervis, in 1843, struck a bank of soundings in from 9 to 15, 16, and 35 fathoms, extending N.E. and S.W., from lat. 21° 38′ S., long. 39° 35′, to lat. 21° 51′, long. 39° 50′, or about 15 miles in extent. Within this there is a depth of above 160 fathoms between it and the shoal water, extending off Cape San Thomé. Whether a less depth than this of 9 fathoms exists in this locality has been doubted, but in the subsequent description of the Brasilian Coast there will be found a statement, that 5½ and 4½ fathoms had been found within 25 miles of the Cape. This must be left for future determination, though the uneven nature of the bottom in this vicinity would render such a fact not improbable.

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* See Captain Powell's (commanding the *John Adams*) letter respecting his soundings in the "Annales Hydrographiques, vol. iii., p. 239, and the "Nautical Magazine," 1850, p. 187.

9. MEDEIROS ROCK (?).

A rock, just awash, in lat. 25° 41′ S., long. 44° 47′ W., or 132 miles S.W. by S. of the entrance to Rio Janeiro, was seen by a pilot of Bahia, named Medeiros, in February, 1811. The position here given is uncertain.

10. LAUREL SHOAL, OFF THE RIO DE PLATA.

The *Laurel*, M'Donald, from London to Valparaiso, put in to the River of La Plata on the 19th of June, 1822, having been obliged to bear up to repair some damage sustained by a heavy sea breaking on board her.

The master reports as follows:—That, on the 15th of June, he discovered a shoal in lat. 36° 28′ S., long. 51° 30′ W.; that it appeared to be about a mile long, and the same in breadth, with a sea breaking very high over it; that it had the appearance of sand, and little water on it. He passed within half a mile, and then hove-to, sounding with 20 fathoms of line, and found no bottom. He further states that he had a good chronometer on board, and was 6 miles (which way?) out of his longitude when he made the port of Monte Video.—*Newspaper.*

11. THE ISLAND OF ASCENSION.

This solitary island, lying in the track of shipping bound to the Cape, has received much attention from the English Government, towards its resources as a place of refreshment for vessels passing. As will be found by the subsequent description, its natural advantages have been signally improved, and are still under course of increasing prosperity.

The position of Ascension seems to be tolerably well ascertained, and may therefore be depended on as a point of departure, as may be seen by the results given by the following observers.

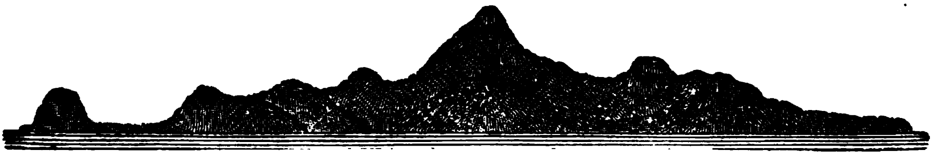
Captain Sabine, who made some observations in 1822, for fixing the position of this island, gave it as in lat. 7° 55′ 48″, long. 14° 23′ 46″. These observations consisted of 164 (16 sets) lunar distances, made in the new Barrack Square during the months of June and July in the above year.

According to the chronometric measurements of Captain Foster from St. Helena, Barrack Square is in long. 14° 25′ 23″, and by a similar measurement by Admiral Fitz Roy, it is in 14° 24′ 40″ W.

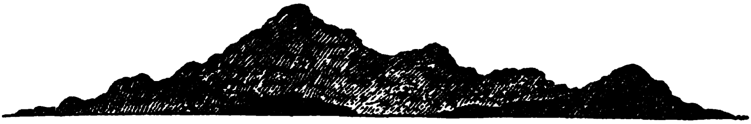
Commodore Owen gives the longitude of Georgetown, from observations made in the *Leven*, in 1826, in the N.W. bay of Ascension, as 14° 26′ 20″; and Captain Vidal, in 1828, made it 14° 26′ 12″. The mean of these five authorities is 14° 25′ 18″, the longitude which is given in the table.

The island was more completely surveyed in 1838, by Captain G. A. Bedford, R.N., who takes Admiral FitzRoy's longitude, viz., 14° 24′ 20″ as that of Barrack Square.

The following appearance of the island was taken by Captain J. W, Monteath.



Ascension Island, N.N.W. ½ W. 9 *miles.*



Ascension, bearing West, 7 *or* 8 *leagues.*

The Island of Ascension* is of an elliptic form, its greatest diameter from East to West, being 7⅝ miles, and its shortest, from North to South, 6 miles. The area of its base at the surface of the sea is 38 square miles, and its circumference about 22 miles.

Ascension is of volcanic origin, and of comparatively recent formation, its surface being exceedingly irregular, and presenting from the sea a barren and forbidding appearance. The highest peak, or *Green Mountain*, is elevated 2,818 feet above the sea, and may therefore be seen from a frigate's deck at the distance of 65 miles. The latitude of this summit is 7° 56′ 58″ S., and if the longitude of the fort be 14° 24′, that of the peak will be 14° 20′. From the summit of the Green Mountain about forty hills may be seen of different magnitudes, being extinguished craters, which have at different periods of the volcanoes actually given vent to its fires. From many of these craters one may trace distinctly the direction of the lava currents on their way to the sea.

All the different varieties of the lavas of Vesuvius may be found here, apparently in a rapid progress of decomposition, so that at some future period this island, like other volcanoes, will be one mass of rich mould. Many of the round conical hills are already fit for being planted with vines, their soil being composed of ashes and a ferruginous earth, a decomposition of calcined ores of iron; of this description is Red Cross Hill, near the anchorage, having an elevation of 816 feet above the sea; but so dry and porous is the soil, that no sooner does the rain fall, that it is absorbed and disappears.

The principal cultivation is on and above Green Mountain, where it rains more frequently than on the less elevated parts of the island. The principal garden is 2,500 feet above the sea; here the climate is delightful, the temperature during the day-time being generally about 74°, that at the landing place near the fort being 85°. The temperature on the peak is still lower; my thermometer, exposed to the current of air sweeping over the peak, fell to 60°; this was at 1^h p.m., the instrument being in the shade, and the sun shining at the time. The summit of Green Mountain is covered with rock roses and several species of fern and mosses, indigenous to the island. There were about 100 acres of land cultivated in 1830, and above 1,000 more fit for cultivation by the plough, on and about green Mountain, independent of many ravines and hollows, containing a rich soil, where no doubt fruit and other useful trees will be planted, so soon as the different fortifications shall be complete.

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* The following description is from the "Nautical Magazine," 1841, p. 690, by Mr. W. Walker, Queen's harbour master.

The climate of Ascension is perhaps as healthy as in any part of the world, and its salubrity is no doubt owing to the constant trade wind blowing in a moderate breeze, ventilating and cooling every part of the island; the dryness of the air, and the absence of marsh or moist soils contribute to the elasticity and buoyancy of the air, and renders the island a most desirable spot for an invalid, who might be transplanted from Tartar Stairs to the mountain in two hours, the distance being 7 miles, from a temperature of 84° to one of 74°.*

Abundance of purslain grows among the rocks, stones, and crevices of the cliffs; this vegetable is eaten by the cattle, and is capable of keeping them alive and in tolerable condition, as was evident from a bullock making his escape, and being absent five or six months, during which time he had nothing to eat but purslain.

The animals that are found in a wild state are rats, cats, goats, and land-crabs; the cats are numerons, but instead of destroying the rats, they take up their abode in the neighbourhood of places frequented by the different species of sea-fowl that visit the island. The goats, rats, and land-crabs are great enemies to farming, destroying all sorts of plants and fruit; they are, therefore, killed in great numbers by the garrison, and may ultimately be extirpated. The weather side of the island is high and inaccessible, with an iron-bound coast, and deep water. No part of the coast is accessible from South-west Bay, round the South point of the island, and as far as North-east Bay.

From the South point of South-west Bay, and along the lee side of the island to English Bay, there is an excellent anchorage in from 10 to 20 fathoms water, sand, and mud; within the distance of 6 miles 300 sail might be anchored at the distance of 100 fathoms from each other; for although the coast from the fort round to South-west Bay be rocky, with foul ground extending about half a mile into the sea, yet I found the bottom perfectly clear without the depth of 10 fathoms.

I have already stated that upwards of forty craters have, in former times, been in a state of activity. Now the island lying within the limits of a constant brisk S.E. trade wind, the ashes, pumice dust, &c., ejected by the volcanoes, have been carried by the wind into the sea to leeward of the island, and formed an excellent anchorage; the bank thus formed has, in the course of time, been augmented by vast quantities of small shells, ground up together, and polished by the action of the waves; and it is those fine pieces of shells that form the various beaches on the lee side of the island, where the sea turtle deposits her eggs to be hatched by the heat of the sun.

Wherever there is a prevailing current in the air or ocean, at an island, the dust in the air, or the mud in the sea, is carried by the current, and deposited to leeward, where a bank is formed on which ships may anchor; this is the case at St. Helena, Ascension, the Madeiras, the Canaries, Cape Verde Islands, &c.

Ascension is visited by the sea turtle between Christmas and Midsummer, and it is supposed that during the above period each female makes three or four nests. The animal remains on the coasts of the island till fifty or sixty eggs are fit for being deposited in the sand. She then lands on the beach, between ten o'clock at night and four in the morning, and going sometimes 150 or 200 yards above high water mark, digs a large pit, about 8 or 10 feet in diameter, and 2 or 3 feet deep, where the eggs are deposited and carefully covered with sand; she then leaves them to nature. In about nine or ten weeks the young turtle breaks its prison, and working its way upwards through the sand, gains the surface, and proceeds directly to the sea. Should this journey happen in daylight, many of the young animals are picked up and devoured by the man-of-war bird, who may be seen hovering over the turtles' nests. For this species of warfare in destroying the young turtle, the man-of-war bird is shot, or otherwise destroyed, by the officers of the garrison.

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* The year is divided into two seasons; the hot months commencing in December, and ending in May; the cool season extending through the remaining months. The thermometer ranges throughout the year in the low lands from 70° to 88° (it has been as high as 90°), and averages 83°; in the high lands it ranges from 62° to 82°, and averages 70°. The island, I apprehend, is not subject to a rainy season.—*Captain Brandreth, R.E.*

There are abundance of excellent fish to be caught among the rocks throughout the year, such as rock cod, conger, cavalhos, &c.; they are so plentiful that a boat's crew may catch enough for a frigate's ship's company. The best place for fishing is on the reef, near the anchorage, beginning with a piece of salt pork for a bait, and afterwards cutting up a fish for bait. Cray-fish are also caught near the mouths of caverns amongst the Rocks towards English Bay. The method is as follows:—hang a piece of fish or pork by a string a short distance below the surface of the water at the mouth of a cavern, the cray-fish observing it will rise to the bait, and may be taken by hand.

The coast to leeward of the island is bold and clear from English Bay to the fort near Tartar Stairs. About a mile to the N.E. of the fort there is a small bay, with a spot of sand on it, on which a boat may land among wild and irregular climpers; this spot has been dignified by the name of Comfort Cove (now called Comfortless Cove), and extolled very much above its real merit. From the foot of Fort Cockburn round to the westward as far as South-west Bay, the coast is, as has been already observed, rocky. The reef runs out about seven-tenths of a mile from the fort in a N.W. direction; it is composed of uneven masses of hard, pointed lava, with spots of white sand in the hollow places; there are many of these pointed rocks on which a ship would strike, and on some of which ships have actually struck; and to prevent such accidents for the future, a large buoy is now moored near the extremity of the reef, on a rock having 30 feet water on it. The following are its marks:—the flag-staff on the fort in a line with the N.E. corner of the jetty, near the crane at Tartar Stairs, and the peak of the Green Mountain, just touching the edge of Red Cross Hill. Should the buoy be gone, by keeping in 10 fathoms a ship will avoid all the dangers on the reef.

It sometimes happens that a very heavy swell sets in from the south-westward, occasioned by *gales of wind* without the limits of the trade winds in the South Atlantic. The long swell rolling in against the wind, and meeting with shoal water and the uneven rocky bottom of the reef, breaks high and with violence, sweeping away thousands of tons of sand from the beach into deep water: this sand is again thrown on shore in fine smooth water.

About half a mile inland from South-west Bay, and behind the lava currents, lying near the beach, there is a tract of land of comparatively smooth surface, and of considerable dimensions; the soil is very rich, but so dry and dusty as seldom to exhibit any other verdure than a little purslain. A little further to the south-eastward, and behind some high conical hills, there is a sandy plain, having an area of perhaps 20 or 30 acres. This level is surrounded by the above mentioned conical hills on the North, and on every other side by high ridges of lava, through which the rains have worn "fiumari," or water-courses, by which considerable quantities of sand and pumice have been discharged into the plain. I could trace very distinctly a line of pumice and other floating materials on the foot of the hills along the lee side of the plain, left as the *last high water mark*, and showing most clearly that at times there has been a depth of several feet of fresh water in the valley, a quantity sufficient to supply the island for many years. This affords the strongest proof of the occasional heavy rains that must fall at Ascension, and points out the propriety of constructing tanks in eligible situations.

Ascension, without water and wood, was formerly frequented only on account of its turtles. "Of this article," says Captain Leslie (1775), "the island furnishes the finest in the creation; the females from, I suppose, hundreds of leagues around, come here to lay their eggs, on which employment they are taken at night: so that they are not only fat and large, but in the highest perfection for eating. Their weight, in general, is from 400 to 700 pounds. They are, of all I ever tasted, the fattest and finest; all others I ever saw before bear no comparison with them.

During the confinement of Napoleon on the island of St. Helena, the British Government, in 1815, deemed it requisite to take possession of Ascension as a military station, and a sloop's crew, under Lieutenant Cuppage, was maintained upon it, who contrived to form a few small gardens; after which, is 1821, Major John Campbell, with two Lieutenants and a small party of marines, proceeded in the *Heron* brig, Captain Hanmer, to garrison the island for three years. Accounts, dated August, 1821, announced the arrival of the new governor; and the garrison, at the period of the Pheasant's visit, in 1822, consisted of the party of the Royal Marines abovementioned, commanded by Major Campbell.

The only buildings on the island at the time were those which had been erected for the accommodation of the garrison; they consisted of an officers' and soldiers' barrack, and a store-house, forming three sides of a barrack square, situated near the landing place on the N.W, side of the island.

Near Dampier's Springs a house was built, and gardens laid out for the cultivation of vegetables; but little more was then affected on the island, except the erection of some scattered huts on the leeward shore, and the clearing of a few necessary roads. After the death of Napoleon, it being determined by the Admiralty Board to make Ascension a depot and place of refreshment for the use of the African squadron, a detachment from the corps of Royal Marines relieved the naval garrison in 1822, as above stated. A year after this epoch in the annals of Ascension, a fever of the most virulent kind was unfortunately introduced on the island by H.M.S. *Bann*, which for awhile suspended the exertions of the new settlers. Many women and children, the families of the soldiers, were by this time located there, the population amounting altogether to about 150 souls; but, sad to say, of these more than a third were swept off in a short space of time by the exterminating pestilence. The crew of the man-of-war, whose encampment on the under plains had caused this evil, suffered in even a greater proportion; and Ascension, possessing a climate the salubrity of which was the theme of every visitor, became a lazar house of corruption. The mountain alone escaped; the fever reached its base, and found several victims at Dampier Springs, but here its course was stayed, communication with the agricultural station being put under severe restriction, and all supplies of vegetables and fresh meat thence derived were placed at certain points of road, from whence they could be conveyed to the town without danger arising from the contact of parties engaged on this duty.

In a few months the fever, which was declared to be of the same character as that so fatal to our West India Islands, seemed to have expended its power; the tone of health in the settlement was restored, and the works once more progressed.*

Again,—"Ascension, heretofore regarded as an impracticable heap of ashes, is now in a most flourishing state of progressive improvement as to its resources, both natural and artificial. When H.M. brig *Slaney* left the island, on the 27th of February, 1827, roads were constructing from the several springs (sixteen in number) to convey water to the garrison; and hopes were entertained of being able to supply a squadron with that essential article, by means of iron pipes, from the principal spring to a reservoir near the beach. Fruit, such as pines, Indian gooseberries, and plantains, had been successfully cultivated. Potatoes, onions, carrots, peas, French beans, and almost every esculent vegetable, had been prodnced; and thus, from a desert cinder, nature has been courted successfully to yield most of her useful vegetable productions. Only two deaths from sickness occurred at Ascension during the preceding two years; and when we consider that gales of wind are unknown to have visited the anchorage there, the value of the island as a rendezvous, and a depot for stores and provisions, for a squadron of observation, destined to cruise either on the African or Brasilian coast hereafter, will obviously repay the liberal attention that has been bestowed upon it."

In May, 1827, the *William Harris*, a transport, returned to Portsmouth, after having landed at the island a variegated cargo of live stock, hares, rabbits, pheasants, partridges, &c., seeds of vegetables, agricultural implements, and a supply of necessaries, with which the vessel sailed from England a few months before, for the supply of the garrison. She also took thither poultry and horses from St. Jago.

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* Rough Notes on the Island of Ascension, in 1836.—*Naut. Mag.*, 1837, p. 795.

The following particulars of this island have been given by Mr. Webster.—On the 10th of February, 1830, H.M.S. *Chanticleer* left St. Helena, and after a delightful passage of four days arrived at Ascension. The scene from the anchorage has a barren aspect, although warmed by the light colour of the sand. The island is interspersed with broken ridges of lava and scattered hills, separated by extensive plains. The surface generally consists of ridges of naked rock, hills of cinders, and plains of ashes, dust, and lava. The general contour of the hills, and the blending of their different colours, impart a soft and pleasing effect on the mind of the spectator; the blackness of one hill is relieved by the ash-grey tinge of another, and the brick-burnt soil of one cone is contrasted with the pumice or brown lava of an adjacent or an opposite one. By this variety and alternation of colour the monotony which would otherwise prevail is broken, and the scenery in some parts assumes a wild and picturesque character.

On the lee side of the island is the garrison establishment, now dignified by the name of *George Town*, and consisting of wooden houses. Besides these, contiguous to them, is the government store, a substantial stone building; a very neat and respectable hospital establishment on a small scale, for the reception of patients from the ships, and for the purpose of supplying them with medicine; a very good smith's shop; a public mess room, and a row of humble buildings for the garrison officers. On Cross Hill, close to the anchorage, is a signal post, which communicates with the mountain house; and Captain Bate, the commandant, had erected a house for himself on the brow of a hill to the eastward of the garrison. An admirable pier or jetty, terminated by a rock, forms the landing-place, on which is a crane, for the purpose of loading and unloading boats.

The establishment at George Town consisted of 110 marines, with 4 lieutenants, a surgeon with his assistant, an agent-victualler, and 50 negroes, or kroomen, from the coast. The garrison comprises many artificers, distinguished by energy and industry. They have erected batteries, built houses, made roads, constructed the pier above mentioned, excavated tanks, blown up rocks, levelled hills, begun boat harbours, walled in turtle-ponds, among other works, under circumstances of no ordinary difficulty. They have formed gardens, have shown the mountain to be capable of cultivation; they have availed themselves of every advantage that nature has afforded them; they have explored the resources of the island with minute accuracy, and have turned everything to the best purpose. The result is, that a small party may be maintained there comfortably, and afford assistance to vessels in the way of fresh provisions; but it is like a slender reed in the hand; if it be overloaded in its establishment, if many persons be allowed to settle on the island, it will wither away under the accumulated pressure; the main object of all the care bestowed on it will be defeated, by the supplies it affords being required for its own settlers, leaving nothing for the ships that call there.

The hills are numerous and of various heights; but the most elevated one is that called the *Green Mountain*, from the light hue of the verdure on its summit. It is nearly in the centre of the island (toward the S.E.), and is 2,818 feet in height above the sea, rising as a graceful oasis amidst waste and desolation; for around it is to be found neither verdure, shade, nor shelter, but one entire field of lava. The lofty ridge of the Green Mountain arrests the watery vapours that would pass it, and supplying George Town, by means of pipes, constitutes the chief blessing of the island. It is said also to have 1,200 acres of land on its summit available for agricultural purposes. There is a good road from George Town to the Green Mountain; the distance to the foot of it being 3¼ miles [English], and to the summit 6 miles. A party of men are usually employed on the Green Mountain in cultivating the land, attending the tanks, and looking after the live stock. The neat little establishment, called the *Mountain House*, is at an elevation of 2,250 feet, and is romantically situated on the brow of the hill. A little garden is attached to it, backed by a wall of black cinders, through which rushes a stream of cool refreshing water. The view from this place over the whole island is awfully grand: not a vestige of green is to be seen below the favoured mountain. Independent of the pleasure of the ride, it is worth the excursion only to obtain a draught of the cool water dripping from the fountain, Craters of extinguished volcanoes are seen in all directions over the mountain. amounting to about thirty. They vary from 100 to 300 feet in height, and are in general circular. One of these, more terrific and rugged in its appearance than the rest, is called the *Devil's Riding Ground*; this being an elevated mound, about half a mile in circumference, with a road winding round it to the summit, walled in on the lower side by a ridge of lava.

At the agricultural station on the mountain much has been effected by the small detachment which could be spared from other works. There the decomposition of volcanic matter is going on rapidly, and consequently producing a rich and productive soil; a large portion of which is cultivated with trees, shrubs, edible and other plants. In this soil, mosses, grasses, heaths, and flowers, have also been carefully and successfully planted. The botany of Ascension boasts 170 varieties. Among the more essential vegetables may be found balm, thyme, borage, horehound, potatoes, beet, parsnips, carrots, turnips, endive, lettuce, celery, mustard, parsley, fennel, sorrel, winter cherry or Cape gooseberry, arrowroot, horseradish, watercress, French beans, leeks, onions, shalots, artichokes, capsicums, cucumbers, pumpkins, tomatos, mushrooms, cabbages, &c.

All these are, of course, more or less in abundance as the season proves propitious to their culture. It is, however, fortunate that large tracts of land have been devoted to the cultivation of the sweet potato, which yields so plentifully, that this vegetable may always be procured. Several other edible plants are equally to be depended on; and the garrison and shipping have, for some years, been readily provided with refreshment of this nature.

The Green Mountain supplies the party at George Town with water, vegetables, fodder for horses, and pasture for a few cows. In the dales, here and there, a few bananas have been produced; and the pineapple, though deficient in flavour. The Cape gooseberry, a delicious fruit, is very abundant on the mountain, and affords the luxury of a tart; it is a species of winter cherry. The castor-oil plant thrives there, and a crop of Indian corn has been produced. The residence on the mountain is cool and agreeable, the temperature being generally 12° below that of the plains; but it is not without its disadvantage, being continually enveloped in mist, which renders the habitation damp, but not unhealthy. Goats were at one time very plentiful on the island, but they are now reduced to a small herd, and hunting them forms one of the chief amusements of the island.

The island is very much infested with rats. Domestic animals are reared with success, and the fowls form a valuable supply for the table. The Green Mountain abounds with Guinea-fowl, which afford amusement to the sportsmen during the season, from April to September. On the northern side of the mountain is the drip of water called *Dampier's Springs*, because discovered by the celebrated navigator of that name. This he did by watching a flock of goats, and observing where they went to drink. It will be remembered that Dampier's vessel, the *Roebuck*, foundered near Ascension in 1701, and that the crew saved themselves on the island, where, after staying three weeks, they were taken off by an English ship. These springs are the treasures of the island.

The insect tribe are dreadfully annoying; flies are so numerous that at meal time they blacken the table-cloth; ants and musquitoes innumerable, with scorpions, centipedes, large spiders, and crickets. The only attractive insect is the mountain butterfly.

The turtle season commences in December, and lasts till May or June. During the height of the season, from forty to fifty are turned in a night; they are taken when they come to deposit their eggs in the sand. There are three or four bays to leeward which they most commonly frequent, and two men are placed during the season to turn them at night; they are then conveyed in carts to ponds where they are kept for provision. It is remarkable that no male turtle have ever been seen; and that the young ones, after they are hatched about four or five months, and are about the size of one's hand, crawl away, and are never seen again until they are 400 pounds weight. They are generally from 400 to 800 pounds weight when taken in the season; and are kept in two ponds. About 400 or 500 is the number generally taken.

Amongst the articles of food, the eggs of the wide-awake furnish an important item, *ten thousand dozen* being often taken in one week during the season; they resemble plovers' eggs, and though the bird is small, the egg is nearly the size of that of the common fowl. The season is irregular, about three times in two years. The indigenous birds are nine in number; the beautiful man-of-war bird, black with white breast and a stripe of white on each wing, the wings measuring 7 feet from tip to tip; two kinds of gannet, two booby tribe, the wide-awake, two petrel, and the boatswain bird, with its long feathers depending from its tail. All these are in considerable numbers, and whiten the rocks where they haunt. The man-of-war bird feeds on fish; but not being able to take its food, it watches the booby returning with a fish, pounces upon it, and carries off the fish. The fish for food here are the rock cod, the cavalha (rather coarse when large, but good eating when small), the conger eel, their best fish; the snipper or soldier (a beautiful fish, quite red and golden when first caught); and a quantity of a fish, with dark skin and beautiful bright purple streaks, abound, but are not good eating; oysters also abound, but are rather coarse, and not much eaten. They have mullet, but I have not seen it. We have turtle in various ways—soups, broth, excellent cutlets like veal, and in pies, which are very good.—(*Journal of the Geographical Society*, vol. V. p. 262.)

The *climate* of Ascension is regarded as singularly healthy. In the heart of the S.E. trade wind, in the midst of the ocean, with the driest soil in the world, and the total exclusion of anything like swamp or marsh, and the absence nearly of all vegetation, there is nothing to taint the air, or to produce impurity. Fever has occasionally been imported from the pestiferous coast of Africa, but there is none epidemic or peculiar to this island. A mild species of dysentery is the most common complaint, and beyond this we cannot specify any. The people on the island have a healthy appearance, and they expose themselves to the sun without any ill effect. Sores heal readily, fractures unite quickly, inflammatory complaints are not obstinate, and every one enjoys uninterrupted good health. Such are the effects of pure air, and so little is high temperature conducive to disease, that the enfeebled invalid from Africa recovers energy and strengthens under the refreshing effects of the sea breeze. The thermometer ranges in the day from 84° to 92° in the shade, during the period in which the sun has South declination, the hottest time at Ascension, or from September to March. It is rarely below 82° in the night. The barometer never rises above 30·1, nor falls below 29·8; the mean for the whole year being 29·95. During the hottest period the barometer is lowest, reaching 30·0; but, during the cooler half of the year the barometer stands higher, and generally [above 30·0. From March to September the thermometer ranges from 76° to 82°; and in the evening there is sometimes a little fall of dew, but it is a very rare occurrence.

The rainy season at this island is about March and April, and is sometimes attended by only a few slight showers; while other seasons are remarbable for the quantity of rain that falls. The average fall of rain throughout the year is very limited, and it is this circumstance that constitutes the great drawback to the natural advantages of the island. After the rains the air resounds with the chirping of crickets, the plains become decked with a short-lived verdure from the purslain, the rivers are swollen and even glutted for a day, and the nourishing fluid is gone, not to return, perhaps, for years.

The coolest season of the year is the driest. During the months of March and April lightning is sometimes seen in the North and N.W. quarters, and an occasional clap of thunder is seldom heard. In May the clouds have very frequently a motion from the West and N.W. against the usual trade, and light airs from those quarters also occur. The rains in the lower part of the island generally occur in the night, or in the very early part of the morning.

But what has been said of the climate of Ascension does not apply to its *Green Mountain*, which will be described in its proper place. Here the temperature ranges from 60° to 86°, averaging about 75°; and the height of the barometer about 27·75. The mountain is generally more or less obscured by mist some part of the twenty-four hours, and it will be shown hereafter that the condensation supplies a large quantity of water, for the use of the residents, with some to spare for that of shipping.

The weather is too hot for the enjoyment of any exercise during the day, which is passed by many in listless idleness. The day-break, as is always the case in equatorial regions, is short, the sun bursts forth suddenly in unclouded splendour; his heat becomes oppressive in the early part of the morning, when there is generally but little wind to counteract his rays; his force throughout the day keeps the thermometer from 84° to 90° in the shade, and the walk over the heated and rugged surface of the island, where not a rill of water is to be seen, and where no shady grove invites the wandering step, is far from enticing; but although the heat, at times, comes with the puffs as hot as the sirocco, it is tempered by a delightful sea-breeze; and toward the evening, when the sun's heat is endurable, a person may ramble out and see him depart with incomparable splendour; and as he dips beneath the distant horizon, the whole western skies glow with the radiance of his golden beams. Suddenly he disappears; twilight quickly fades away as he sinks, and darkness hastens on apace. But night comes on with peculiar charms: where the day has no beauties to display in the land, the darkness veils its nakedness: all is serenity, save the murmur of the distant waves, or the twittering shriek of some wandering sea-fowl. Not a cloud is seen to stain the purity of the firmament above, which, as a glassy sea of azure, is studded with its glorious host of clustering stars, shining with peculiar lustre. The night at Ascension is the most delightful time of the twenty-four hours. It is in the still serene hour of night at Ascension, where neither dew nor chilly vapour falls to check the full enjoyment of it, that groups of its inhabitants are seated in social converse beneath the canopy of heaven, or dwelling on the thought of friends far away—of England, home, and love, whose magic spell still holds the captive heart, although on a distant foreign strand.*

The phenomenon called the *Rollers* has been described on page 117.

In the month of March, 1833, the island was found to be fortified at all accessible points. A new battery was constructed, close to the landing place, to mount seven 24-pounders; and near this is a large tank containing 1,700 tons of water. Iron pipes, of 3½ inches bore, extending 33,000 feet, were laid down, reaching from the Green Mountain to the town, and brought down to it, in many places perpendicular, particularly as far as Dampier Spring.

A tunnel has been cut through a solid mass of cinder, 200 feet above the government buildings at Green Mountain, to carry a pipe through, and to prevent the labour of horses, &c., which had previously been employed in bringing the water down from the heights to the large tanks. This tunnel is 930 feet long, and 6 feet 6 inches in height; it was cut by six men in three months, directed by Captain Payne, superintendent of the works. The stock, consisting of horses, cows, and sheep, is also raised there; the latter being brought principally from the Cape of Good Hope, and are disposed of, on government account, to any ships requiring them, at 30s. per head. There are about 4000 acres of pasture and arable land, including the gardens, &c., on Green Mountain, in excellent order, and which produce many European as well as tropical fruits and vegetables. Wild goats, still numerous, are hunted for the use of the hospital. Wild Guinea fowl, and also the common fowl, are numerous, and afford good sport for a bold sportsman, but not for a timid one. From the scarcity of horned cattle, and the difficulty of providing provender, fresh beef is issued but once a year; turtle, one and a quarter per man, twice a week. The island is under martial law, no settlers being allowed to reside upon it; consequently the whole labour is performed by the marines, who are allowed rations for extra services.

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* Mr. Webster's Narrative, Vol. I. pp. 1—6.

At the date of these remarks, March, 1833, there were provisions for the garrison for eighteen months. Want of rain was then a great drawback; the supply of water from the springs being very limited.*

It is a curious fact, that in later years a considerable change in the climate has been perceived. For months together, I have been told by several who have been resident from three to seven years, as well as by Captain Bate, not a cloud would pass over the heavens, nor a drop of water fall; but since the land on the mountain has been so much cultivated, a gradual increase of rain has taken place; seldom more than a day passes over now without a shower or mist on the mountain; and during the first ten days we were here constant little showers fell.† The mountaineers, like the Children of the Mist, inhabit a region of clouds for many months in the year, and clothe themselves in woollen garments; while the lowlanders are frequently perspiring at every pore, though clad in linen.

Remarks on the anchorage, by Captain Hunt, of the ship *Atlas*, March, 1832.

The Island of Ascension being both convenient and safe for ships homeward bound to approach, when in want of provisions, water, or repairs, and Captain Bate, with the officers of that establishment, most attentive and ready to relieve the wants of ships of any nation resorting thither, and their means to do so and to render assistance being superior to any other place between the Cape of Good Hope and ports in Europe, it is to be regretted that accidents have so frequently happened to vessels touching there, in most cases through want of knowledge as to the position of the rock and reef lying N.W. of the anchorage.

The anchorage is in Sandy or Clarence Bay; a prominent rock, on which is a fort, forming its western boundary. Ships may anchor in any part of this bay, in moderate depths of water.

Commanders of ships coming from the eastern side of the island, intending to anchor or cruise off the settlement until they have gained supplies, must observe that no safe anchorage can be found to the *westward* of the fort, neither is the shore safe to approach within 1½ mile of it to the *westward*.

The best guide to clear the reef and rock lying to the N.W. of the anchorage, and on which many vessels have grounded, is to keep the houses and barracks open to eastward of the fort, and never to shut them all in with, nor open them to, the *westward* of the fort, unless the distance from the land be at least 1½ mile. In the latter case they would be in great danger of striking on the reef above mentioned, the spit or rocks of which lie nearly a mile from the nearest point of the shore.

A buoy, painted black and white, is laid on the spot. When this buoy can be seen, a vessel should never pass to the westward of it, unless her distance from the land be at least 1½ mile. The sea does not always break upon this rock, but there is always a considerable swell passing over it.

Ships approaching Sandy Bay, from off the *western* side of the island, must be careful not to advance nearer to the land than 1½ mile, until the houses and barracks be opened to the eastward of the fort. They may then stand into Sandy Bay to their own depths, free from all danger.

By attention to the above observations it will be impossible for ships to meet with accidents; for on all other parts of the island the coast is bold [North not excepted], and may be approached to within a cable's length.

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* Mr. James R. Rea says, "that in a visit to that island in July, 1838, Captain Evans, the commandant, informed me, that he had received an order from England a short time previous, to the effect, that only in cases of extreme want or distress was any provisions to be supplied to vessels calling there. Nor is water to be had in such an abundance as I was led to believe; one gallon a man per diem, allowing the passage from there to England to be forty-two days, was all that could be spared to the Trinculo. Government has fixed the price of turtle at 50s. per large and small. Thus you see that there is no inducement to shipmasters to give preference to Ascension over St. Helena."

† In November, 1834, see "Journal Geographical Society," Vol. V. p. 259.

In consequence of the accidents above alluded to, Captain Bate, the commandant, in November, 1829, gave notice that a rock of 15 feet, on which a whaler had touched, and another of 12 feet, had been buoyed. The upper part of the buoys is white, and has a sheet of tin, whereon is painted the depth of water, which is visible at some distance.

At the 12-feet rock, the stairs, called *Tartar Stairs*, bear by compass S.E. ½ E. one quarter of a mile.

At the 15-feet rock the same stairs bear E.S.E., nearly half a mile.

These rocks are only two of many that compose the reef extending from the foot of the fort along shore to S.W. Bay, and running out to seaward a large half mile from the shore, being a formation of hard pointed lava rocks, with spots of white sand.

A large buoy is or was likewise now placed on the N.W. point of the reef, on a rock having 30 feet of water over it, with 8 fathoms outside of it. At the buoy the crane at Tartar Stairs bears by compass S.E. by E. ¾ E. seven-tenths of a mile. No ships should go within the buoy, or come nearer to the reef than 10 fathoms of water; for, during a long swell, the sea breaks on the reef from within a cable's length of the buoy the whole way to the shore.

The landing place is on the flight of steps at the extremity of a wharf; a small crane near it assists boats in approaching, and persons on landing. The beach consists of very small fragments of shells, in some places so firmly compacted together as to form slabs, which may be worked into tomb-stones, steps of doors, or broken and burned for lime.

Time Signal Ball.—In order that vessels calling at the island of Ascension may readily find the error and rate of their chronometer, a time-ball is dropped daily (Sundays excepted) from a flagstaff at the master's cottage, precisely at one o'clock of Greenwich mean time.

The master's cottage is situated immediately to the southward of Hayes Hill, and is the only cottage near it bearing a flagstaff. The ball, when hoisted ready to drop, is at a height of 90 feet above the level of the sea, and may be readily seen from the anchorage.

The longitude of the flagstaff is assumed at 14° 25′ 30″ W., or $0^h\ 57^m\ 42^s$; the ball, therefore, is dropped at $3^m\ 18^s$ after noon, mean time at Ascension.

Vessels not intending to remain for the usual time of showing the signal may have the ball dropped at any convenient hour of Greenwich time by making a request at the master's office at the cottage. (August, 1860.)

The following "Notes on Ascension" are by Captain Lewis Bilton, of the *Queen of the East*, published in the "Mercantile Marine Magazine," 1861:—

The store is kept by Mr. Snelling, and contains all that a ship generally requires in chandlery, &c., and at moderate prices; and any article he is short of can be obtained by indent on the Government at a charge of 25 per cent. on the cost price. Turtle, pigs, and occasionally sheep, may be had; of the first, however, not more than two will be supplied to each ship, at a charge of about 50s. each. They generally average above 400 lbs. weight, and make a fresh mess for two or three days, which is very acceptable to Jack after a three-months' course of salt beef. No bum-boats, or other similar annoyances, infest a ship,—no boat being allowed alongside but with the Governor's permission, and the crew have no means of getting drunk on shore, as they cannot even procure a bottle of beer without the master's permission; this saves him from many of the disagreeables which are incidental to St. Helena and the Cape.

About the time that the guano was finished on the island of Ichaboe, 1847-8, an individual named McBride came to Ascension, and having obtained the necessary permission, succeeded in obtaining about 1,800 tons of that article: having, however, come into collision with the authorities, a stop was put to the shipment of it, and no one has been allowed to collect it since that period. There is a detached islet or rock, covered with it, on the eastern side of the island, with a clear passage inside, where his vessel anchored.

Water, although generally very scarce, will always be supplied, if really wanted, at the rate of a gallon per man per diem for the voyage, at about 8s. per tun.

There is no difficulty in going into the bay. Run down to windward of the island, and shave close round the North end to ensure fetching well in to windward, as it blows right out; attention to the flaws is necessary to avoid being taken aback, and with good management a ship will always go to the anchorage without making a tack. Sail should be gradually reduced, as the ship runs down, to topsails, foresail, jib, and spanker; and the anchor cockbilled and ready, with a good scope of chain, say 50 to 60 fathoms, as it sometimes blows fresh off the high land. The boarding officer from the *Meander* will suggest to a stranger the best place to anchor. On rounding the North point the ships in the bay will be seen, and then Georgetown, which is a perfect pattern of neatness and order. The public buildings, barracks, hospitals, fort, &c., and the residences of the officers, have quite a picturesque effect, standing high above the beach on Sandy Bay. The houses of the government *employés* lie in a valley, and are not distinctly seen from the anchorage. There is also an African town to the right of the landing place, inhabited by Kroomen and other Africans in the service of Government; they form a distinct community, and their village is called *par excellence* Krootown.

The whole island is exclusively a naval depot. The captain of the guardship, *Meander*, resides on shore, and is governor *pro tem.*; his period of office is three years. He resides in a pretty cottage on the side of a hill, named Hayes Hill; there is a time-ball here which is dropped daily, Sundays excepted, by the present captain, at 1 p.m. mean time at Greenwich. The longitude is 14° 25′ 30″ W. or 57^{m} 42^{s}. It falls, therefore, at 2^{m} 18^{s} past noon mean time at Ascension; vessels not intending to remain till that time, may have it dropped at any convenient hour of Greenwich time, by a special application at the captain's office. There are also two lieutenants, a surgeon, and about fifty petty officers and crew in the frigate, who live on board permanently, except in the turtling season, when boats' crews are away at the different bays for a fortnight at a time, or even longer, turning the turtle and bringing them to Georgetown, where there are two large ponds, into which the tide flows and ebbs, ensuring a constant supply of pure sea water, and in which are frequently some hundreds, which are killed, and served out to the islanders four or five times a week; fresh beef is allowed on two days only. The present governor, Captain Burnett, however, prohibited any turtle being taken last year, as there were symptoms of their falling off in numbers, and cause to apprehend that they were leaving the island. A captain and two lieutenants of marines, with about 150 men, reside on shore, but are borne on the books of the frigate; they do all the military duty in the island. There are also a master, purser or paymaster, storekeeper, carpenter, surgeon, and chaplain, all of whom likewise live ashore. This station is much liked by the officers, who being able to have their wives and families with them, the tedium of duty for three years is lightened. They are all very hospitable and kind to strangers visiting their solitary island, and I can bear testimony to many pleasant hours spent in their company.

They have a very nice little church, which forms a picturesque object from the Roads; also a news-room, in which are all the latest papers and periodicals, to which strangers have access during their stay at the island, through the courtesy of the officers, and to which it is desirable that contributions should be made of the latest papers from the port the ship has left. The whole town looks as if built with cards. The verandahs of the houses are filled with flowering shrubs, which give a pretty appearance, and the ladies take great delight in them. The whole of the adjacent country, for miles round, is nothing but scoria, and immense blocks of lava and slag, without a blade of grass, save in some of the valleys, where a few flowers find root, "and waste their sweetness on the desert air." There is a very neat little burying-ground, about half a mile from the town, on the West side of Sandy Bay, and where many officers who have come up sick from the pestilential bights of Africa lie entombed; few others die here, the climate being exceedingly healthy, and no epidemics are known. I was struck with the beauty of some of the tomb-stones. They appeared to be of a description of stone I had never seen previously, and I had made up my mind to procure a few specimens to carry home to England, when, on enquiry, I found they were merely wood, painted with some preparation, and then covered with repeated coats of the beautiful coraline sand from the beach, which soon becoming hard, the epitaphs are carved on them, and great care seemed to be bestowed on these relics of the dead.

There is a post-office in the governor's office, where letters are taken charge of. The mail, however, requires two months from England, having first to go to the Cape, and round St. Helena.

Ships can leave at any time (day or night). All that is requisite is to heave up the anchor, set the fore-topsail, and having catted and fished the anchor, make sail as the ship leaves the island. This has always been my plan.

The rollers set in occasionally, and for a day or two it is sometimes not safe landing, which has caused many ships to leave, not being able to get off stores, &c. But there is a bay between the town and the North point, where boats can always land on these occasions (if dispatch is a great object). Generally, the ordinary landing-place can be used. It is a curiosity, too, in its way, being at the face of a projecting rock, through which a passage is cut, and a staircase and a small crane is fixed, with a rope to swing a person into or out of a boat when there is much swell. It is named Tartar Stairs, and is sheltered by a rock outside, named Marline Spike Rock, which in some measure prevents the swell from rolling in. The sea in ordinary weather never breaks here, and care is only necessary to keep the boat from striking the rocks. This is easily done, as buoys are laid down for them to ride by, and be hauled off, or slacked in, to the landing, as required. A sergeant of marines is always in attendance, and a flag hoisted when landing is impracticable. A large crane on the rock above is used to discharge cargo, coal, &c., when the weather is favourable. A reef runs out to the northward through the centre of the harbour, with a perch on the outer extreme—having a passage inside it. On this reef at least one ship has been lost; but it could only have been by the greatest carelessness or neglect that such an event could have occurred, as it is quite visible.

The *Tortoise*, an old Dutch Indiaman, many years the guardship of Ascension, yet lies in the roads, but is now converted into a coal hulk. Many visitors to the island will remember the hospitality of her officers to passing strangers. Fish can be either bought from the blacks at Krootown, or caught at the anchorage with very little trouble. Cavallo, bonito, snapper barracouta, &c., being in abundance. Turtle are game, and are protected till out of sight of the island.

Many people are of opinion that the vegetation at the Green Mountain will gradually extend itself over the island, as the hills wear away, and soil accumulates to afford root for it. Rain, however, seldom falls; I have known none to have done so for eighteen months at a time. The inhabitants are always kept on allowance of water, never exceeding two gallons each, and sometimes they are reduced to one only. On one occasion, the *Tortoise* had to be sent to St. Helena for a supply; this, however, is not likely to occur again, as the present governor has made many reservoirs to collect the article; but of course care is necessary. Torrents of rain must sometimes fall, however, if one may take the gullies hollowed out by it as a criterion. It, however, at once runs off, without penetrating the hardened soil. Vessels coming from India and proposing to call here should bring plenty of potatoes, onions, pickles, preserves, and paddy, or gram, and also hay, all of which meet a ready market; also a few nick-nacks. Blue silk, pith hats, cigars, &c., are always in demand, and I would recommend a master being liberal with the first-named articles, and he will find his account in it by being assisted in many ways.

12. THE ISLAND OF ST. HELENA.

The longitude of the observatory on Ladder Hill, at St. Helena, as given in the table, 5° 42′ 30″ W., is the result of the observations of Lieut. Johnson in 1830; these consisted of fifty-four observations of moon culminating stars compared with observations at Greenwich, Cambridge, and the Cape of Good Hope. M. Daussy, from the same observations, calculates it as 5° 42′ 51″. Captain FitzRoy places it in 5° 42′ 19″. Captain Foster, who connected James Town chronometrically with the Cape of Good Hope, places it in 5° 43′ 15″. In Lieut. Raper's table it is stated as 5° 44′ 48″, or 1½′ W. of Lieut. Johnson's rsult. Commodore Owen, from his observations in the Leven, in 1826, gave it in 5° 44′ 48″; and according to Capt. Heywood it is in 5° 44′ 15″. The latitude of the observatory is 15° 55′ 26″ S.

The magnetic observatory at Longwood is determined to be in lat. 15° 56′ 41·2″ S., long. 5° 40′ 28″ W., agreeing with Lieut. Johnstone's observations.

The island was surveyed by Major Rennell, but it was never published. Another survey was made in 1816 by Mr. Baines, C.E., but the most perfect topographical map is that from the trigonometrical survey by Captain Edmund Palmer, R.A., F.R.G.S. in 1851-2.

From this survey it is 10⅝ statute miles extreme length, East and West, between the King and Queen Points and West Points, and 7 miles N. and S. between Powell Point and Sugar-loaf Point.

The principal hills are Diana's Peak, the highest point of the island, about the centre of the southern ridge, 2,704 feet; Cuckold's Pit, near to it, 2,684 feet; High Peak, 2¼ miles to westward, 2,635 feet; Halley's Mount, 2,467 feet; Flagstaff Hill, on the North side, 2,272 feet; White Hill, above Sandy Bay, on the South side, 2,425 feet; Lot, 1,430 feet; Lot's Wife, 1,550 feet; besides very numerous others.

The area of the island is about 47 square miles, or 30,300 acres, of which 1,133 are cultivated, 7,652 acres pasture, and 21,515 are waste.

The population, according to the census of April 7th, 1861, was 6,444, or 3,370 males, and 3,074 females. Besides this, in 1862, 1,614 liberated Africans were landed here from prizes, and 1,479 of them emigrated to the West Indies.

About 250 vessels enter per annum, and 36 to 45 clear from it; the value of the imports in 1861 was £128,000; in 1862, £138,000; the exports were £9,337 in 1861, and £16,186 in 1862.

This minute spot lying such an immense distance from the continents on either side of the South Atlantic, would be one of the most isolated and solitary places in the world, were it not for the fact that it lies, like Ascension, on the great homeward thoroughfare from the Indian Ocean.

St. Helena lies within the limit, and in the strength of the south-east perennial or trade wind; and its roadstead is off James Town, on the north-west or leeward side of the island. Westerly or northerly winds seldom blow with force or duration, so as to endanger the shipping in the road.

History and Description.*—The island was discovered by the Portuguese

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* In addition to the information given in our previous editions, we have availed ourselves of a translation of a graphic account of a visit to St. Helena by Captain Fokkens, of the Dutch marine, in 1849, as detailed in the invaluable *Verhandeligen en Berigten*, by the Chevaliers G. A. Tindal and J. Swart, Amsterdam, 1850.

"A Guide to St. Helena, Descriptive and Historical, with a visit to Longwood and Napoleon's Tomb," St. Helena, 1851, contains a great amount of useful information.

"St. Helena," it is said, "is famous for an inexhaustible supply of fresh water, without a river; for an indigenous 'wire-bird,' with legs like a sandpiper; for a splendid display of prickly pears; an iron-bound coast; a ladder 600 feet high, the high road to the upper

Admiral Joao da Nova Galego, on St. Helena's Day, 1502. In 1513 it became the voluntary abode of Fernandez Lopez, a Portuguese nobleman, on returning in disgrace from India; who, being left here, with a few servants and some useful animals, assiduously cultivated its resources. In a few years he was recalled to his country, and imparted the advantages of St. Helena to the East India trade. Thomas Cavendish, in his famous cruise around the globe, visited the island in 1588, and found, as he has said, "Divers handsome buildings and houses, a church tiled and whitened, very fair, a causey made up with stones, reaching into a valley by the seaside." This valley he describes as the "fairest and largest low spot in all the island, and is exceedingly sweet and pleasant, and planted in every place either with fruit or with herbs. There are fig trees which bear fruit continually, and very plentifully; for, on every tree, you may see blossoms, green figs, and ripe figs, all at once; and it is so all the year long. There is also great store of lemon trees, orange trees, pomegranate trees, and date trees, which bear fruit as the fig trees do, and are planted carefully and very artificially, with pleasant walks under and between them. In every void place is planted parsley, sorrel, basil, fennel, aniseed, mustard-seed, radishes, and many very good herbs. The fresh water brook runneth through divers places of this orchard, and may be made to water any tree in the valley." The English ship *Bonaventure*, Captain James Lancaster, was here in 1593, having been driven back, after leaving the Cape, and remained about three weeks.

For some time after the departure of Lopez, the island does not appear to have been regularly inhabited; but in 1640 the Dutch attempted to establish a settlement here, which they relinquished, in 1651, to the English East India Company; and to this company the entire possession and sovereignty of the island were granted by charter of Charles II., 3rd of April, 1661. At the close of 1672 the Dutch, by the treachery of one of the inhabitants, again obtained possession: but it was soon recaptured by three of the king's ships, under the command of Capt. Richard Munden. The island thus relapsed by conquest to the crown, but was regranted by the king to the East India Company, in whom the property and sovereignty have since been vested. The second charter, dated the 16th of December, 1673, constituted the governor and company the true and absolute lords and proprietors of the island, with full legislative power, but, as near as may be, agreeably to the laws of England, and reserving also the faith and allegiance of subjects of the crown, and the rights of the natives, to all intents and purposes, as if they had been abiding and born within the realm. In 1836 St. Helena was transferred from the East India Company to the crown for £100,000.

The island, when first descried from the *northward*, appears like one vast rock or castle, surrounded by the ocean; the coasts being generally high, rugged, and precipitous. On advancing, the prospect gradually improves; the mountains appear in varied hues, and then assume the verdant tint which distinguishes their summits. The rocky coasts will now present a striking contrast to the green hills and valleys of the interior. The town will next be seen, seated in a narrow valley between the mountains, with the batteries, the church, and the white houses, interspersed with trees, constituting altogether a picturesque and animating scene.

It is surrounded by a wall of precipitous cliffs from 1,000 to 1,800 feet in height, intersected by chasms serving as an outlet for the watercourses of the island, and terminating in small coves more or less exposed to the fury of the waves. There are no less than twenty-three of these openings around the coast; but landing is almost impracticable, except on the north-western or leeward side, and at Prosperous and Sandy Bays to windward, and even then only in favourable weather.

The most singular phenomenon connected with this part of the ocean is the setting in of very heavy continuous swells, called "rollers," from the N.N.W., particularly during the month of February, when the waves burst on the leeward shore with

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regions; a time-ball, like a Dutch cheese on a May-pole; for the possession of Lot and his wife; a petrified friar; for extinct volcanoes which cannot be found; the grave of Napoleon; and for not having had a wreck on its shores time out of mind.

astonishing grandeur and impetuosity. During their continuance landing is extremely dangerous, and can only be effected by watching the intervals between the swells. In February, 1846, thirteen vessels, moored at half a mile from shore, were totally wrecked, and the wharves and batteries suffered considerable damage.

The island is divided into two unequal parts by a lofty ridge of mountains from 2,000 to 2,700 feet above the sea level, extending in a semicircular sweep from S.W. Point to Stone Top Point at the S.E. The principal eminences on this range are—High Peak, 2,635 feet; Diana's Peak, 2,704 feet; Actæon's Mount, 2,700 feet; Little Stone Top, 4,380 feet. (*Major E. Palmer.*) Numerous spurs branch off from this ridge: those to the North and N.E. decreasing in altitude, but increasing in extent, as they approach the sea, where they terminate in precipitous cliffs, and form the boundaries of the deep valleys debouching on the coast. The spurs from the S.W. of the ridge are suddenly broken about one mile and a half from their commencement, the land which they originally supported having subsided, leaving but a wreck of the original formation, with here and there towering fragments of basalt, like the buttresses of a gigantic ruin. The appearance of this part of the island is magnificent in the extreme; and to a spectator on the ridge above presents a variety of form and richness of colour baffling description. Every attention has been directed to the proper delineation of this district in the map, and to resolve the apparent chaos into a system of unity.

The island appears to have suffered at different periods from the effect of volcanoes and earthquakes. General Beatson supposes that is the shattered remains of an ancient continent, connected in former ages with the other rocks of the Southern Atlantic. The district of flat country, comprising the plains of Longwood and Deadwood to the East of the island, would seem to support this theory, particularly as an indigenous tree (*Conyza gummifera*) which grows here is also found on Tristan d'Acunha. The remains of a vast crater are (*vide* Seale's Geognosy) to be traced between Flagstaff Hill and the Barn Rock, N.E. of Longwood; but I did not observe any other formation in the island to answer the description of a crater. Limestone is found in different parts of the island, viz., Rupert's Bay, Sugar-loaf Point, and Potato Bay, that from the last-named place being of excellent quality. Gypsum is found near Prosperous Bay. Carnelian in Turk's Cap Bay. The honey-combed (amygdaloidal) basalt and red tufa afford excellent material. A layer of fossil shells (univalves) has been discovered near Flagstaff Hill, 2,000 feet above the sea. (*Major E. Palmer*, R.A.)

Off the S.E. end of the island are two pointed rocks standing high out of water, the outermost of which is called George Island, and the inner one the Shore Island, or the Column of Hercules. Close off the southern Cape Castle Rock Point are those craggy rocks called the Needles, or Speery Island, Robert and Salt Rocks; and 2 miles to the northward of the western point of the land close to the shore are two more, Buoys Peaked and Egg Islands. They are all barren rocks, the largest of which is not 300 yards in circumference.

Approaching the island from the S.E., the land appears to slope gradually from the middle of it to the northward, terminating abruptly in Barn Point, the N.E. point, which rises to a ridge called the Barn, the highest point of which is the Haystack, 200 feet high. Beyond this Sugar-loaf Point is seen the northern extreme of the island, and near which is the well-known pinnacle-shaped mountain called the Sugar-loaf, 1,927 feet above the sea. At the foot of this mountain are the batteries, a short distance apart from each other, called Butter-milk Above Bank, and Beneath Bank batteries, about 100 and 200 feet above the sea.

Shipmasters must be careful not to get to leeward of the road, but to make the island from the eastward, keeping Sugar-loaf Point, when rounding it, close on board.

Formerly, all vessels on passing this point sent a boat to the first-named battery to give the name of the ship and the object of her visit, but of late years this has been discontinued. On that account our seamen give it the name of "Pry Corner." About one and a half mile S.W. of this point is Munden Point, on the S.W. of Rupert Bay, which forms the eastern boundary of James Bay, in which, at the entrance of a small valley, James Town is situated; the best anchorage off it is in from 12 to 20 fathoms. The western point of the bay is formed by a steep perpendicular hill called Ladder Hill, about 800 feet above the sea. The distance between these two points is about 3 cables' lengths. Between Pry Corner and Munden Point is Rupert Valley, where landing can be effected.

View of St. Helena, from the Road.

The only LANDING PLACES are at *Rupert's* and *James'* or *Chapel Valleys.* In Rupert's Valley, towards the sea, stands a strong battery; but the valley is not habitable, because it has no water. In the entrance James' Valley stands *James' Town,* which is defined by a fine line of batteries, and flanked by a high inaccessible battery upon the rocks called Munden's, close under which all ships must pass that come to an anchor before the town. As soon as Munden's Point is passed, James' Town appears suddenly between rocky precipices 1,000 feet high. The white buildings and church, with the green foliage of the neighbourhood, give a pleasing effect to the scene, improved by contrast with the adjacent craft. Immediately behind the water battery, and front of the town, stands the castle, distinguished by a flagstaff, and near to it on the right is another large house called the "Times Office." In the first are the offices of the government officials, the other is the dwelling of the harbour master. The Times Office is provided with a mast, from which at a stated time a white time-ball falls in sight of all the vessels in the roadstead, as presently described. The principal street consists of neat and well-constructed houses, and divides into two others; one on the East, leading to the country in that direction, and the other to the upper part of the valley, where the barracks, the new garden, and the hospital are situated. In the western street are a number of shops; but the houses here are very inferior to those in the lower street, where the principal inhabitants reside.

The water that supplies the garrison and shipping is conveyed by leaden pipes from a spring in the valley, called Chubb's Spring, distant more than a mile from the sea. These pipes lead the water to the jetty, where there are two cranes for the use of boats in loading with goods or watercasks, or for receiving stores from the shipping. The water is of the purest quality, and in great plenty. In a moderate season six hogsheads are yielded every minute, and shipping may be supplied with 300 tuns every twenty-four hours. The price is 3*s.* 7*d.* per tun.

On the right or western side the valley is entered from the interior by the steep promontory called *Ladder Hill,* 800 feet above the sea; the zig-zag road upon which, 9 feet in breadth, has a wall on the side next to the precipice, and is very easy of ascent. On the left of the valley, the carriage road, called *Side Path,* is the avenue to the interior of the island eastward. This road, which has been made with great labour and difficulty, goes with an easy ascent transversely to the level above, whence the prospect is striking and delightful: from a sterile brown and barren rock you view the most lively verdure, beautiful lawns, with sheep and cattle feeding in different places, interspersed with small houses, which have generally a large inclosure laid into gardens. This view is terminated by a prospect of the sea, or by high rocks, apparently heaped one upon another to a stupendous height. The plain called *Long-*

wood, toward the eastern side of the island, contains the greatest quantity of level ground. A considerable space on it is planted with trees, but it is deficient in water. This plain, 1,762 feet high, forms another point of view. The scenery is here enlivened by a small winding stream, which, falling from the heights into the valley, makes a delightful cascade. Upon the edges of the stream water-cresses are often plentiful. At the S.W. end of this plain is Longwood House, Napoleon's residence, and also the magnetic observatory.

The botany of St. Helena is interesting, affording nearly sixty species of indigenous plants, the most remarkable of which are—the *Island Ebony* (Dombeya melanoxylon), now nearly extinct, but found in the shape of gnarled and broken trunks on the hills to the South; the *Red Wood* (Dombeya erythroxylon) is also almost extinct; *String Wood* (Acalypha rubra); the *St. Helena Tea* (Beatsonia portulacifolia) is only found on the summit of Sandy Bay Barn and the flanks of High Knoll; also ferns of great beauty. Trees and shrubs from all parts of the world have been collected in the gardens of Plantation House, where the oak, bamboo, aloe, pine, &c., flourish together.

The main ridge of the island is covered with a luxuriant vegetation of tree ferns and cabbage wood (Solidago cuneifolia), nourished by a constant moisture.

Upon descending from this elevation we find the hillsides clothed with the richest grass, and the watercourses overhung with bramble and fuchsia; lower down, woods of Scotch fir, larch, oak, and the Port Jackson willow. On approaching the sea vegetation gradually disappears, the summits of the hills within 1¼ mile of the coast being almost barren, with a scanty growth of samphire (Salsola salsa). In the valleys, however, where water can be procured, the gardens produce abundance of fruit and vegetables, especially pumpkins and bananas. The island appears favourable to the growth of coffee and cotton, particularly in the valleys to the South of the main ridge, which are well irrigated and extremely fertile.

A considerable quantity of rock orchella was exported in 1851, but of inferior quality to that found in the Cape Verde Islands.

The flocks of wild goats which existed in the island at the period of the visit of Cavendish have dwindled down to a very small number, a few being shot from time to time on the heights near Sandy Bay. Sea-fowl and guinea-fowl are also extinct, but the ravines are the resort of numerous coveys of the red-legged partridge, and the pheasants frequents the thick cover on the higher ridges. An indigenous bird, resembling the sandlark, with long legs and grey body and wings, called by the islanders the "wire bird," is found here. Doves, Java sparrows, amaduvades, and canaries inhabit the gardens, the last-mentioned be remarkable for the richness of their tone.

The rocky islets round the coast swarm with sea-birds, particularly the beautiful white bird (Procellaria nivosa); and the man-of-war bird and tropic bird are to be seen wheeling their flight high above the lofty pinnacles of the island.

The shores abound with mackerel and albacore, the principal food of the poorer inhabitants. Sharks of great size and voracity are now and then captured; and during the month of August schools of whales (black fish) are frequently seen, affording many an animated chase to the boats of the American whale-ships.

Cattle are constantly imported from the Cape of Good Hope, although the island is capable of supporting a large number, the stock in 1857 amounting to 1625 horned cattle and 4230 sheep. The quantity of pasturage is 7652 acres.

No snakes or reptiles, except a few centipedes and scorpions, are found on the island. Rats, however, are a terrible plague, and nothing is safe from their depredations.

The sheep and beasts are in no respect degenerated by change of climate. In some situations rabbits abound; pheasants and partridges are numerous, and the gardens are enlivened by the notes of the canary bird. Fish, to the extent of seventy species, have been found on the coast; among these mackerel is peculiarly abundant, but some are very unwholesome. The shell fish include turtle, oysters, and two species of lobster. Sea fowl deposit immense quantities of eggs around the island, which are collected in the fall of the year, and constitute an agreeable article of food.

Of the climate under which such products are found, but little need be said. The thermometer is seldom higher than 80°, and the summer not so hot as in England. The winter is also milder, commonly ranging between 55° and 56°, a temperature in which the vegetation of leaves proceeds with more equality, perhaps, than any other. Thunder is seldom heard; but, with a sultry atmosphere, lightning is not unfreqently seen. There have been seasons of drought, wherein the cattle have perished from want of water; but, in general, rain is experienced in all seasons, particularly in July, August, and September, or the summer months of the northern hemisphere. Sir Joseph Banks has said that "every month has its share: there are more rainy days in February, however, than in any other period; and cloudy days throughout the year exceed in number, almost two to one, those in which the rays of the sun fall upon the earth without interruption, and scorch the vegetation."

On the ridge above Ladder Hill is the Observatory, established by the East India Company, under the superintendence of Captain Johnson, of the St. Helena artillery; but it was discontinued at the commencement of the present government of the island.

The practice of discharging rockets for rating the chronometers of vessels touching here has also been discontinued, and a time-ball has been substituted: this ball was originally hoisted at the Observatory, as shown in the margin; but as the Observatory is no longer in use, the ball has been removed from the hill to the town, and is in charge of the master-attendant, whose attention to it is unremitting.

Observatory, on which the time ball was formerly exhibited.

The ball drops at mean noon, St. Helena time, for the benefit of the inhabitants, and at 1 p.m. for the advantage of the shipping. The ball is hoisted half-mast high, five minutes before the time, and at one minute before to the mast-head.

The official notice, dated St. Helena, 21st of January, 1834, states that—

To prevent mistakes, a *white ball*, hoisted upon a staff, will denote the time as follows: the ball will be hoisted half-mast at *five* minutes, and close up at *two* minutes before *twelve o'clock*.

At the instant of the *mean time*, at noon, of St. Helena, the ball will drop from the top of the staff, when the gun will be fired at High Knoll.

The signal will be repeated at 1^h, at the instant of *Greenwich mean time*, for the benefit of the shipping.

A ship wishing to correct her chronometers, and arriving after 1 p.m., and not likely to remain the twenty-four hours, may hoist the *Blue Peter* at the main-top gallant mast-head, when the same method will be adopted at the next ensuing hour after the signal. Foreign ships to substitute their ensign for the Blue Peter.

Should there be any uncertainty, and the ship wishes to have the signal repeated, she will dip the flag, and rehoist it on observing the ball half mast. The ball will again drop at the ensuing quarter of the last hour.

Ships concealed from a view of the signal station will attend to the repeating ball at Ladder Hill, and in neither case is any allowance to be made for loss of time, since the astronomer will make the calculation of the few tenths required. A charge of 5s. is made on shipping for the use of the time-ball.

The late Admiral FitzRoy, in his chronometric expedition, described hereafter, made the situation of a spot close to high water mark on the meridian of the Observatory, lat. 15° 55′ 15″, long. 5° 42′ 45″.

The objects of interest at St. Helena are Plantation House, the residence of the governor; Sandy Ridge; and Napoleon's grave. The last is about 4 miles from James Town, and the route to it affords the best opportunity of seeing the finest scenery of the island, as it is in the direct route to Diana's Ridge and to Longwood. It lies in a valley, having a little fount of water, moss-grown and beset with brake and fern. The valley is adorned with wild flowers, among which the roses and geraniums bloom throughout the year, and mingle their delicious perfume. This was Napoleon's favourite resort, and here his remains were deposited.

Napoleon Bonaparte, "who bestrode the majestic world like a colossus," arrived at St. Helena, an exile prisoner, on the 13th October, 1815, and on May 5th, 1821, he died at Longwood, a villa 6 miles from James Town, in the sixth year of his exile, and the fifty-second of his age. On the 4th the island was swept by a most tremendous storm, which tore up all the trees by the roots. About six in the evening, Napoleon having pronounced "*Tete d'Armée,*" passed for ever from the dreams of battle. He was buried, as above stated, and his grave was for nineteen years the principal object of interest in this, his island tomb. On May 5th, 1840, the anniversary of his death, his body was formally demanded of the British government, and on October 15th, 1840, it was removed from its resting place, and conveyed to the Hotel of the Invalides, in Paris.

The land in Napoleon's Vale, where his tomb was situated, about 23 acres, and the house and land at Longwood, about three acres, was purchased by the government in 1858, at a cost of £1,600 for the tomb, and £3,500 for the house, and conveyed to the Emperor of the French and his heirs in perpetuity. A French officer is appointed as guardian of them, and a copy of the equestrian statue at Cherbourg was to be sent to the island.

HARBOUR REGULATIONS.

Art. 1. The commanders of all vessels are obliged to make over to the collector a manifest of freights for St. Helena, besides a list of passengers and luggage, the goods coming from Great Britain and Ireland to be opened in the entrepot, and also to give notice before they unload. A penalty of £100 is inflicted in neglect of it.

Art. 2. No boat or other vessel, except the pratique boat, shall be allowed alongside a ship newly arrived before a communication has been allowed by the medical inspector, and which will be made known by hoisting a white flag on the main-top-gallant mast-head.

Art. 3. Every ship displaying a yellow flag at the fore-top is in quarantine.

Art. 4. Every commander of a ship must give twenty-four hours' notice to the Secretary of Colonies before his departure, but if he wishes to leave again within the twenty-four hours after arrival, immediate notice must be given; neither may he take any persons whatever off the island without the knowledge of his Excellency the Governor, or Colonial Secretary.

Art. 5. No boat is permitted to make fast to the buoy or buoy rope, neither to the crane nor to the waterman's place while any other boat is unloading, loading or letting in water. Neither shall any boat so loading or unloading be allowed to remain over a reasonable time.

Art. 6. No boat shall be allowed to remain at the steps of the landing-place taking in passengers' baggage longer than necessary.

Art. 7. No boat shall be allowed to remain fast to the steps longer than absolutely necessary, but remain a short distance off in order not to prevent other boats from landing.

Art. 8. No gunpowder is allowed to be landed without four hours' notice being given to the Offier of Artillery or Harbourmaster.

Art. 9. No boat whatever may land any person or luggage from any ship, except H.B.M. ships, on any other part of the island than James Town without having special leave.

Art. 10. Every person visiting a vessel on board of which there is an infectious disease, must remain on board until such disease has left, or go with the ship to such place as the Governor may think fit.

Art. 11. No fish may be landed at the innermost steps, nor any offal left behind at the landing place, neither is any bathing allowed in the harbour, nor bones of large fish or carrion to be thrown into the sea within a quarter mile of the shore.

Art. 12. Boat hire:—

	£	s.	d.
For one person to or from on board	0	1	0
For more than one, each	0	0	6
For every package under 25lbs. (English)	0	1	0
For every package above 25lbs. and under under 100lbs.	0	1	0
For every additional 100lbs.	0	0	6

Art. 13. Licensed boats must not refuse between sunrise and sunset to take any one on board a vessel at anchor, neither refuse to wait alongside when requested.

Art. 14. All vessels in quarantine must be moored on the West side of the harbour, under the surveillance of the harbourmaster.

Art. 15. Commanders of vessels who come for water must send in a written request signed by themselves, to the office of the harbourmaster, specifying the quantity required. The time ball at James Town falls at 12^h, as at the island, or 1^h of Greenwich, 15° 55′ 25″ South lat., 5° 42′ 30″ West long., or 22^m 50^s in time. For the information of commanders and passengers, it may be observed that the gates of the town are closed, and the bridges drawn up at 9^h p.m. and remain so until the morning gun fire. Those who wish to return on board must leave the town before this takes place.

DIRECTIONS.—The best routes from Europe to St. Helena have been described on pages 156, 157.

As *James Town* is situated in the most leeward part of the island, ships, in coming in, are obliged to keep close under the land, by which means their decks are entirely exposed to the battery above. Another disadvantage is that of eddy winds, calms, and violent gusts, which lay them almost on their broadsides; so that the natural strength of St. Helena is almost sufficient for her safety.

A ship bound to this island must run down along the North side of it, within a cable's length of Sugarloaf Point, and afterwards keep the shore close on board; and likewise within a cable's length: there is no danger, and it is bold and steep-to. On the West part of Sugarloaf Point stands a small fort; and a little to the southward of it is Rupert's Valley; the next point, to the southward of the valley, is Munden Point, which, like all the rest, must be kept close on board; you then come to James Valley, off which is the place of anchoring.

You may anchor in from 8 to 15 fathoms; the flagstaff at the port bearing from S.S.E. to S.E. by S.; Sugarloaf Point N.E. by E.; and Horse Pasture Point S. by W. ½ W., distance off shore about half a mile; with these bearings you have a good and convenient berth for watering. This bank runs out to the westward, off the fort, about 1½ mile, and deepens gradually from 7 fathoms near the shore to 30 and 35 for about 1¼ mile, when it deepens suddenly to 60 fathoms, and then no soundings. The bottom in the road is coarse sand and gravel. You will find no soundings until you come abreast of Rupert's Valley, where there are 18 to 20 fathoms.

One watering place is just without James' Fort, where there is a crane for striking the casks into the boats; the other is at Lemon Valley, where there is the best water, and you may fill the casks in your boats with a hose.

Although the anchorage is well sheltered and easy of access, the surf is at times so high that no boats can land for several days together. These surfs are most prevalent in the months of January and February, and many lives have been lost in consequence of boats being upset by them. During this time the weather is fine, the wind light, and no *obvious* cause to produce so extraordinary a phenomenon as these surfs present. The spray commonly rises to the height of 50 or 60 feet, produced by a wave from the sea, which at the time appears to be in a perfectly quiescent state.

Barn Ledge, on the N.E. side of the island, represented in the particular plan on the Chart, is from one-half to three-quarters of a mile from Barn Point. It is about 1½ cable in circuit, has generally a heavy ground-swell upon it, with from 12 to 6 fathoms, and several pointed rocks of 25, 21, and 20 feet. From the Ledge, Barn Point bears N.W. ¼ N. about three-quarters of a mile; Turk's Cap in one with Turk's Cape Battery, about three-quarters of a mile. Large ships coming from the S.E. should keep George's Island open with Saddle Point until Sugarloaf Point is open with Barn Point. This leads clear of the Barn Ledge, between which and the shore are 24 and 20 fathoms, in a channel more than a quarter of a mile wide. Close to the Ledge, on the outside, are 32 and 34 fathoms.

There is also a ledge off the South Point of St. Helena, at rather more than a mile. This is the *Speery Ledge*, a reef, 2 cables' length in circuit, with depths of 15 to 10 fathoms, and pointed rocks of 24 to 18 feet. A heavy ground swell is frequently on it. From the ledge, Speery Rock bears N. by E. ¼ E.; the North Black Rock, N. by E. ½ E. nearly touching Speery Rock; the S.W. or Man and Horse Point, about N.N.W.; Long Range Point, E. by N. ¾ N.

To avoid the Speery Ledge, if sailing along the south-east side of the island to the westward, keep the Shore Rock open with Long Range Point till the northernmost of the Black Rocks opens to the westward of Speery Rock; then you may haul up for the S.W. point of the island. About a mile W. by N. of Speery Ledge is a patch of 10 fathoms, rocky bottom, between Speery Rock and the Ledge are 24, 26, and 35 fathoms, and the bank of soundings extends 2 miles without the Ledge, in a South and S.S.W. direction, with 50 and 58 fathoms, fine sand, on its outer border.

ISLES OF TRISTAN DA CUNHA.

These isles are three in number, forming a triangle, of which the largest isle, *Tristan*, is the N.E. point. The other two isles were named by the French, in 1767; the westernmost, *Inaccessible Island*, and the smallest, or southernmost, *Nightingale Island*. The group appears to have been discovered by the Portuguese in their earlier navigations, and was farther explored and described by the Dutch in 1643, and by the French in 1767.

At present it is the domain of an interesting community of English people, whose manners, simplicity, and excellence of character remind us strongly of the somewhat similarly placed family upon Pitcairn Island in the Pacific, the retreat of the mutineers of the *Bounty*. As we are able to trace, from successive visitors, the progress of these isolated people, we give such extracts here as may cause the passing mariner to view with greater interest these children of nature.

The situation of these islands is important to our outward-bound Indiamen, and its correct position, which we now give, will afford an excellent means of rating chronometers.

According to Captain H. M. Denham of H.M.S. *Herald*, who touched here on his route to the Pacific, in November, 1852, as presently related, the N.W. extremity, which is near the settlement, lies in lat. 37° 24′ 8″ S., long. 12° 18′ 39″ W.*

M. D'Etchevery gives the following account of the French exploration:—"September the 9th, 1767, at 5 a.m., I made the three islands of *Tristan da Cunha*, bearing East and E. by N., distant about 10 or 12 leagues; the wind then westerly, I steered East to examine the middle island [*Inaccessible*], which is the westernmost; and being at noon abreast the N.E. point, I sounded at a mile from the shore, with the middle of the island bearing West, where I found 20 fathoms, black sand, and some reddish stones. This island is high, flat at top, and may be seen 15 or 16 leagues off: it is about 2 leagues in circuit, and appears barren, steep, and inaccessible;

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* It has formerly been placed from 10′ to 37′ farther eastward, as stated in the notes to the Tables of Positions.

some scattered shrubs only are to be seen on it; I perceived no danger near it, but a rock, like a boat under sail, is visible at the S.E. point.

"I stood on, leaving this island, to examine the smallest, which is 3 leagues to the S.E. It has, on the N.E. point, two islets, separated from it about 50 paces, and which have the appearance of an old ruined fort. I passed along at pistol-shot distance; continuing to steer along the island, I found ground at 30 fathoms; and, when its middle bore W.S.W., I anchored in 33 fathoms, coarse brown and reddish sand.

"The night threatened bad weather. I postponed sending the boat ashore till morning: according to the report made to me, it is so full of seaweeds twined together that there is much trouble in approaching the barren rock which forms the island. The reeds, with which it is covered, did not let them penetrate the island, besides the great number of penguins, whose eggs are so close together that the men could not walk without breaking them; these difficulties, and the want of fresh water, which they searched for in vain, induced them to return on board. They saw plenty of fish on the coast, and many were caught.

"September 10.—Weighed anchor in the morning, and steered toward Tristan da Cunha, the largest of the three islands, which lies about 5 leagues to the N.N.E., true, of the little one. It is about 5 leagues in circumference, and so high that it may be seen 25 leagues off. The peak in the middle of it is covered with snow, and the land thence, down to the sea, covered with bushes. In coasting near the land, after doubling the N.W. point, I descried a cascade, which falls into a little bay; I sent the boat to sound this part; 18 fathoms were found close to land, and 30 at a quarter of a league from shore. We anchored in the latter, grey sand, mixed with small sand.

"The boat which went on shore found no difficulty in approaching it, but from the entangled seaweed, which bars all the coast. A cask of fresh water was brought on board, which had been easily obtained; but they could not land, excepting to the left of the cascade, on a beach of round pebbles, about the size of an egg. To the right of the cascade are rocks, on which the sea breaks heavily. The shore was covered with seals and sea lions; plenty of fish were caught, particularly of a species of cod."

An approach to the islands may be generally known by the floating seaweeds, seen on the water, which are sometimes met with far out at sea.

INACCESSIBLE ISLAND presents a high bluff, of forbidding appearance, which may be seen at the distance of 12 or 14 leagues. NIGHTINGALE ISLAND, irregular, with a hollow in the middle, and a small rocky islet at its southern extremity, is descried at the distance of 7 or 8 leagues.

"The *Blenden Hall*, Captain Greig, from London to Bombay, was totally lost on Inaccessible Island, on the 23rd of July, 1821. The commander, officers, and passengers, got safe on shore, but eight of the crew perished. They remained on the island, exposed to cold and rain, until the 8th of November, on which day the carpenter and three or four of the crew embarked in a small punt, made out of the wreck with surgical instruments which were thrown ashore, and reached Tristan da Cunha, where they procured two whale boats, and brought those that remained on Inacessible Island away. On the 9th of January a brig from Brasil put into Tristan da Cunha for water, and took them all away, and on the 18th of January they all arrived safe at the Cape. During the time they were on the island, they had no food but penguins and their eggs. Out of some bales of cloth washed on shore, they made tents; an iron buoy, sawed in two, was their only cooking utensil. They were for four days exposed to heavy rains and intense cold, before they could procure fire. The ladies and passengers suffered severely, nothing being saved but the clothes they wore, the ship going to pieces two hours after she struck."

A further account states that the *Blenden Hall* sailed from Gravesend on the 7th of May, and was lost on the day above mentioned, 23rd July. It appears that the weather had been very thick; on the 22nd they had an observation, and found themselves near these islands, of which they wished to get a sight in order to correct their reckoning. Consequently every look-out was kept for seaweed, which is known to be an indication of nearing them: an altitude of the sun was taken at 8^h in the morning of the 23rd, and, about 19^h, every body being on deck, seaweed was discovered, and it was soon found that the ship was surrounded by it; the helm was put down: but, by reason of light winds and a heavy swell, the ship did not come round. Breakers were now heard ahead; the jolly boat was now lowered with a tow line, but with no effect, the wind having quite subsided and the swell driving the ship on the rocks. An anchor was let go, but the extreme depth of the water did not allow it to take hold; the cutter was then lowered down to assist the jolly boat in towing the ship's head round, when she struck. The weather was now so thick, from a mist or cloud, that the two boats could not be seen, though close alongside, nor could the land be discovered. The masts were then cut away; the fog blowing off, terrific cliffs are discerned over their heads, at about half a cable's length, and the sea began to make a clear breach over the ship. The two boats now landed about 200 yards off; and while those on board were endeavouring to throw overboard the long boat, the ship filled and went to pieces. The crew clung to the forecastle, some of the beams of which held fast to the rock; and, on a hastily made raft, eight men got on shore, and one was drowned. A rope was now flung from the shore to the remainder, and at about 4 p.m. all were landed without the least water or a morsel of provisions. Water was, however, found, and provisions were supplied by knocking down penguins, collecting eggs, sea elephants, and seals. Tents were erected with some of the coarse cloth and sails that were washed on shore; but it was four days before they could make a fire, in which they at last succeeded by means of a rocket which was washed on shore. On the 19th of October a boat was built, in which eight of the crew endeavoured to make Tristan da Cunha; but they have not since been heard of. On the 8th of November a second boat was made, and ten of the crew succeeded in getting to that island; and, with the assistance of two whale boats, the whole of the unfortunates were transported from their desolate situation by the 9th of January following, having been without bread for nearly six months. The brig *Narina*, of London, Lackland, master, kindly took the crew and passengers thence to the Cape of Good Hope, consisting of four ladies, three children, twenty passengers, and eleven seamen. Two seamen were drowned on the wreck, and eight are missing in the first boat that was built. Though this island is within sight of Tristan da Cunha, and every signal was made by means of fires, smoke, and flags, yet no assistance was rendered until the second boat made known their situation. This island is about 9 miles round, is well wooded, and remarkably high; so much so, that it is a day's work to attain the summit, but is constantly enveloped in clouds and visited with squalls; has no harbour nor cove, and can be landed on to leeward only; a heavy swell constantly prevails, which prevented these sufferers from obtaining fish as a change in their diet. The unfortunate ship was of 400 tons burden, and had 52 persons on board, mostly passengers bound to Bombay.

TRISTAN.—This island is discoverable at the distance of 25 leagues. Toward the northern part there is an elevation 1,000 feet perpendicular from the sea; then commences a level or table, extending to the centre of the island: and above that rises a conical mountain, not very dissimilar to the Peak of Tenerife, as seen from the bay of Santa Cruz. Having previously examined the shore, and taken soundings in boats, the *Lion* stood in, and anchored in the evening, on the North side, in 30 fathoms of water. When the ship was at anchor, she was overshadowed by the dark mass of that portion of the island, whose sides seem to rise like a moss-grown wall immediately from the ocean. Here a sudden gust of wind started the anchor, and the ship for safety put to sea. The sword fish, whales of every species, sea lions and seals, penguins and albatrosses, appeared to frequent the coast.

To the log book and notes of Captain John Patten, of the ship *Industry*, from Philadelphia, we are indebted for the following information. Captain Patten was a temporary inhabitant of the largest of the three islands, where he remained with part of his crew, collecting seal skins, from August, 1790, to April, 1791. He says, "They all consist of very high land, with clear open passages between them. Their shores are, in general bold, and are exempt from shoals or other dangers to navigation, except a high reef of rocks, or rocky islets, off the South end of *Inaccessible*, the smallest island.

" *The current sets to the N.E.* There is a regular tide, the water rising from 8 to 10 feet. While Captain Patten was there, the prevailing winds were from the northward and westward; the easterly and southerly winds blowing but seldom, and scarcely ever longer than twenty-four hours at a time. It generally blows fresh, and frequently very hard, from the N.W.; and when a gale came on, it was generally preceded by a very heavy sea, rolling in sometimes twelve, and sometimes twenty-four hours before the wind rose. The weather is very subject to be thick and hazy, attended with much rain. The summer months are warm, but the cold in winter is very severe.

" There is a bay on the N.W. side of the large island, which, however, is open and exposed. It has a fine beach of black sand where the boat was hauled up. There are two falls of excellent water, affording an abundant supply, sufficient for the wants of a large fleet; and from one of these cascades the water casks might be filled by means of a long hose, without moving them from the boats. The *Industry's* people pitched their tents at this bay. Around it is plenty of wood. The trees do not grow high, but their branches bear down, and spread on the ground, The foliage of the trees that principally abound resembles that of the yew tree, but the wood is like that of the maple, and burns remarkably well; the trunks are about 10 feet in height, and about 9 inches in diameter. There are no large or tall trees to be met with. A great deal of drift wood is found on the East side of the island, but none to the westward. Abundance of wild celery, sour dock (sorrel), and wild parsley, is met with. The rocks yield great quantities of the sea-weed called laver, and the shore is covered with a broad seaweed, several fathoms long (*fucus giganteus*). No quadrupeds were met with, except some goats, left there by former navigators, and which were very wild. Seven of them were shot. Neither vermin nor venomous creatures of any description were observed. Of birds the principal were a kind of gannets, like wild geese, which the sailors considered as excellent food; penguins, albatrosses, cape cocks and hens, and a bird like a partridge, but of a black colour, which cannot fly, is easily run down, and is very well flavoured; and a variety of small birds, that frequent the bushes and underwood. Abundance of birds' eggs are to be obtained in the proper season.

" There are large quantities of fish, particularly a kind of large perch, some weighing six pounds; file fish, in large scoles, craw fish, star fish, and others. The had no nets, and therefore did not catch much fish. What they caught was with hook and line, and the craw fish were thrown up by gales of wind. No other shell fish were found. The shore is covered with seals, sea lions, and sea elephants (the tongues of which are reckoned good eating), and whales abound in the offing, particularly *killers*. Most of the whales observed in these latitudes were cow fish, or females.

" In the seven months that Captain Patten was on shore at Tristan da Cunha he obtained 3,600 seal skins, and could, he says, have loaded a large ship with oil in three weeks. Both the sea elephants and sea lions, as well as the seals, afford large quantities of oil; but as their business was to collect skins for the China market, they killed such seals only as suited their purposes. September he reckoned to be the best month for making oil at these islands.

" The middle of the large island rises in the shape of a sugar loaf, and is very much elevated. Trees grow halfway up, but, higher up, the mountain consists of bare and rugged rocks, frequently hidden by the clouds, and the summit is covered with snow during the greatest part of the year. No snow, however, was observed to fall on the coast. There is a considerable extent of level land between the foot of the mountain and the shore, the soil of which is a fine rich loam, of a red colour, and considerable depth, apparently adapted to the production of every kind of vegetable; and, excepting the danger of devastation from high winds, adequate to any cultivation.

"The productions of the other islands are nearly the same as those of the large one. They afford no safe anchorage.

"Captain Patten saw the remains of different wrecks at Tristan da Cunha, such as the bowsprit and mast of a cutter, several spars, some of which were worm-eaten; some iron hoops, and other pieces of iron; but he did not perceive the marks or traces of any huts or habitations.

"Captain Colquhoun, of the American brig *Betsy*, touched at Tristan, and planted potatoes, onions, and a variety of seeds there."

Captain Heywood was at Tristan on the 5th and 6th of January, 1811, and found the variation, close to the island, 9° 20′ W. The height of its summit was found to be about 8,326 feet above the level of the sea. Three Americans were there, who proposed to remain for a few years, in order to prepare seal skins and oil, for sale to vessels that might touch there. The interior appeared to abound with goats and wild hogs; and to be formed, like St. Helena, of abrupt hilly ridges, with chasms or deep valleys between them, probably of volcanic origin.

On the 4th of February in the same year, Jonathan Lambert, one of the Americans above mentioned, by a curious and singular edict, declared himself sovereign proprietor of these islands. In a short time he cleared about 50 acres of land, and planted various kinds of seed, some of which, as well as the coffee tree and sugar cane, were furnished by the American minister at Rio Janeiro. The seed sprung up, appeared very promising, and the general aspect was that of a valuable and important settlement. The whole was, however, abandoned, and formal possession afterwards taken in the name of the British Government, by a detachment from the Cape of Good Hope.

An official notice, 30th March, 1817, announced the occupation of the islands by a force from the Cape; stating further, that "there is a good convenience for watering at the principal island."

The island, was, however, again evacuated; but, lastly, several families voluntarily went to it, after it was given up as an establishment, entirely independent of control from government; and in the London papers of April, 1824, there appeared the following statement. "The Island of Tristan da Cunha has now upon it, living in great happiness, twenty-two men and three woman. The *Berwick*, Captain Jeffery, from London to Van Diemen's Land, sent her boat ashore on the 25th of March, 1823. The sailors were surprised at finding an Englishman, of the name of Glass, formerly a corporal in the artillery, and the rest of the above mentioned population. Glass gave so favourable an account of the island, which is only 9 miles in diameter, that it may be of importance to vessels, on their passage to Van Diemen's Land, to touch there: they will be sure of a most favourable reception. There are on the island plenty of pigs, goats, potatoes, cabbages, &c.; abundance of fish and excellent water. This little colony had, at the time, upwards of 80 tons of potatoes to dispose of. The island is very fertile, in fact, in everything desirable to settlers; and Glass declared that, if they had but a few women more, the place would be an earthly paradise. He is governor, by appointment of the rest, on account of his military character; and he trades in a small schooner to the Cape of Good Hope with the oil of the sea elephant, and the skins of the seal, which they catch in great abundance. The crew of the *Berwick* saw the mountain at the distance of 50 miles off.

Captain Benjamin Morrell, in the United States ship *Antarctic*, touched at Tristan da Cunha, in November, 1829. At this time the Captain says, "There were seven families, living very comfortably under the administration of Governor Glass, having for sale plenty of bullocks, cows, sheep, hogs, goats, rabbits, and poultry; also potatoes, cabbages, beets, parsnips, carrots, onions, and pumpkins; together with butter, cheese, eggs, and milk; all of which can be had at short notice, on moderate terms, and in any quantities. The inhabitants were very friendly, accommodating, and hospitable, and expressed their sympathy not so much in words as in actions.

They pressed upon me many palatable dainties. I hope to call and see them again."

In the "Nautical Magazine," of June, 1836, is a communication from Capt. James Liddell, dated ship *Wellington*, on her way to Madras, 2nd December, 1835; and from this the following are extracts:—

"In my outward passage, being driven by a succession of south-east winds far to the south-west, I was gratified by the opportunity offered of renewing my acquaintance with the inhabitants, whom I had previously visited three times. We arrived off the island on the 12th of October, and were immediately boarded by the island boat, containing old Glass (or the Governor, as he is invariably styled there), and his five companions, who were overjoyed to see us again. When a vessel heaves in sight, the men are always on the alert; and, to attract attention, whenever the ship is sufficiently near to see it, they set fire to a large heap of brushwood, constantly kept in readiness for the purpose.

"A large increase of the inhabitants had taken place since our last visit in 1831, the number now reaching 41, exclusive of Glass's eldest son, absent in a whaler. Though they have frequent intercourse with American whalers, I was surprised to find that they had seen no free trader since we called four years ago. As the poor people are entirely dependent on ships for supplies of clothes, and many other necessaries, it may be imagined with what joy an Indiaman full of passengers is welcomed.

"On this, as on former occasions, my passengers, especially the ladies, were exceedingly liberal in their presents of wearing apparel, blankets, books, &c.; and I had great pleasure in adding to these valuable supplies a fine calf, with wheat, barley, and oats, for seed, and a variety of stores. Their stock consists of fifty head of cattle, seventy-five sheep (which at present thrive indifferently), and a large quantity of pigs and poultry. The weather being very fine, all my passengers (except the ladies) were gratified with a trip on shore, when the Rev. J. Applegate, of the established church, took advantage of the opportunity to baptize twenty-nine persons, from the age of a few months to seventeen years, after an affecting address to all the assembled inhabitants. This was the first time they had ever seen a clergyman; and a baptismal register was now left with them. In the uneventful history of their little community, our visit will no doubt form a very important era.

"In offering these few details to the perusal of your numerous readers, I am actuated by a hope that some commanders of Indiamen may be induced to call at the island, whish lies very nearly in the best route to India, when circumstances permit, as their visits will not fail to confer an incalculable benefit on the poor inhabitants.

"The wind happened to be very light during the few hours we hove-to off the island, and the barometer was high; but we had scarcely left it, when a gale came on rapidly from the northward, accompanied with thick rainy weather, and a heavy sea. I mention this as a proof of the great uncertainty of the weather there, and the extreme danger of ever anchoring, as is recommended by a correspondent of yours, signing himself 'Albert,' in your last January number. He appears to consider it the 'St. Helena' of outward bound Indiamen! but, after a good deal of experience, I have no hesitation in saying that 'Albert' is greatly deceived. Though, for the benefit of the poor islanders, I have recommended to my brother commanders to call when convenient, I would desire to caution all from calculating with any confidence even on communicating, since, in two instances, when purposing to touch there, the boisterous weather prevented us, and out of our four visits (all in the summer season), the last was the only one in which we were favoured with fine weather."

Mr. Glass has cut a trench from the run of water that forms the "Cascade," from which a hose is attached, and fills the water in the cove. However, if there be any swell running, the best way is to raft it, as there is no inconvenience arising from the seaweed, beyond an oar fouling occasionally.* Observe, also, that the current generally sets to the E.N.E. The ship ought to keep the Cascade to the eastward of South, in order to enable the boat to fetch the cove with the raft (supposing the wind westwardly); and when the boat is returning, and has gained a sufficient offing to run down inside of her, and receive the raft with the head offshore. The people on the island will cheerfully render all the assistance in their power.†

A correspondent of the "Nautical Magazine," who dates from Bombay, 12th June, 1834, says, I consider Tristan d'Acunha (Tristan da Cunha) the St. Helena of the outward voyage to India. Under ordinary circumstances it is easy of access, with very moderate charges. Money is not wanted, the people wishing barter. Tea, coffee, sugar, wine, spirits, &c. (the Americans supply bread), will be taken in exchange. I charged 15 per cent. on cost, and they seemed satisfied.

The *Diana* and *Mary*, from Liverpool, in December, 1833, after being retarded by adverse winds, received supplies here. The population at this time consisted of 6 men, 6 women, and 28 children. Mr. Glass reported that the government had sent them, from the Cape of Good Hope, a medicine chest and a bale of blankets. They said the women were very badly off for clothes in winter; they had been supplied mostly by ladies in passing for India, and were much in want of some linsey-woolsey.

The following extracts from Captain H.M. Denham's notes on his visit in H.M.S. *Herald* will give the latest and most interesting intelligence of this remote colony. November 11th, 1852. It was 2 p.m. before we approached the island sufficiently near to pick up a boat which we had observed to put off from the S.W. point. From the crew, which consisted of two Englishmen, one Dutchman, and one American, we learnt that the little settlement of nine families was situated on the N.W. point of the island. These fine, healthy, and robust fellows, clad and speaking as Englishmen, made us feel that they came from an island of Great Britain; even the Dutchman had become English.

We were now lying-to, at 2½ miles off the stupendous cliffs, but not without anxiety lest the heavy swell should be accompanied with rollers, while the ship should lie in the eddy winds, or calm occasioned by those cliffs, which hoist a vessel at this distance round and round upon her heel, driving and drawing her under the cliff, where no bottom can be calculated upon for an anchor to avoid destruction.

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* It is desirable to know where this seaweed originates, and how it is subsequently dispersed in the ocean. On the 1st of March, 1823, in lat. 36° 33′ S., long. 6° 55′ W., Captain R. Coulter, in the ship *Westmoreland*, passed several patches of it with tangle; and next day, in lat. 36° 54′, long. 4° 27′ W., another quantity of the same, with a large flock of white sea birds. (Sea Pigeons?). See the descriptions of *Lennon's Reef* and *Robson's Reef* hereafter.

† The following document is as curious as it is honourable to the islanders.

"We, the undersigned, being three of the principal inhabitants of the island of Tristan da Cunha, do hereby agree to furnish any respectable middle aged people (as man and wife), who are willing and capable to undertake the office of schoolmaster and schoolmistress, with house and all necessaries for their subsistence, as well as to present them every year at Xmas with a tenth part of the amount of sale of our produce, so long as the schoolmaster and mistress shall conduct themselves with propriety, and choose to remain with us. And we do further agree, that any person sent to us with a certificate of good conduct, and necessary qualifications, signed by the governor of the Cape of Good Hope, or by Admiral Warren (the naval commander-in-chief), shall be considered by us as eligible to the situation, and their passages to this island paid to the master of any merchant vessel bringing them, immediately on their arrival, the sum of passage money having been agreed upon by either the governor or admiral before mentioned.

"Signed by us, at Tristan da Cunha, this 17th day of January, 1834, on board his Majesty's brig *Forrester*, in the presence of Commander Booth, R.N.

"W. M. Glass, Governor.
"Richard Riley, his X mark.
"John Taylor, his X mark."

A N.W. wind placed us rather to leeward of the settlement on the next morning, and rendered the landing place a lee shore. Nevertheless, being a moderate breeze, and looking for advice and assistance from our friends of last evening, who encouraged our project of landing, this being their finest (young summer) season, we stood in.

The first cast of the lead while standing in was 46 fathoms (sand), at 1¼ miles off shore, abreast of the cottages situated on the tabled tongue of land immediately under the almost perpendicular side of the mountain, which slopes down to the sea from an altitude of 8,300 feet on all sides of the island, except this flat space which forms the north-western projection of the island.

A heavy forbidding swell rolled us onwards as we left the ship, and directed our boat towards the strip of dark pebbly shore marked by the islanders' whale boat, near the steep roadway which they have cut laterally with the cliff. This only clear spot, as respects boulders, can be hit upon when the islanders' boat may happen to be abreast, by making for the beach about a cable's length to the eastward of the cascade above the high water mark cliff, which ranges round this table land at from 10 to 100 feet above the sea level.

Keeping our eyes upon the men on the beach close to their boat, we approached with confidence, looking to them for a sign if we were not right in attempting the surf, which, judging from the undulation we were in, was likely to break fearfully at their feet. We were too distant as yet to see more than that it did break; when, however, we were at one-third of a mile from the beach, we entered the zone of kelp, or tangle, which girts the island at that distance. Once amid this tough seaweed (*fucus giganteus*) which grows up firmly rooted in 15 fathoms water, the crests of the swell are allayed, and the break on the beach becomes proportionably moderate. But the boat becomes less manageable from the obstruction to her oars which the weed presents, although she will live a long time amongst it by making fast to it and riding between the outer waves and the beach surf. In our case we dashed in, as we were not beckoned away, and, shipping one sea, our whale boat was hauled up with the assistance of the young men who had accompanied the venerable governor (Glass) to the beach, before she could ship another. Thus, guided by common care, we effected a safe landing.

The precarious weather which prevails at the island, to the exclusion of visitors at the risk of not regaining their ship for days together, would have prompted us to embark early in the afternoon, for we soon learnt that two successive days' steadiness of wind, weather, or swell, could not be reckoned on. The weather on this occasion tempted us to prolong our visit until sunset, for the purpose of learning as many particulars as possible concerning these isolated people, who, as a nucleus of English blood, language, customs, and church, claim our sympathy and protection.

The inhabitants of Tristan da Cunha are all English by association, though not by birth and parentage. The population now (1852) amounts to 85 persons, all acknowledging the Church of England communion, and are under the postoral care of the Rev. William Taylor, appointed by the Society for the propagation of the Gospel, at the instance of an unknown benefactor, who, sympathising with the Tristan da Cunha people in their destitution regarding religious and moral instruction, had remitted to the Society, in 1849, £1,000, to provide a resident clergyman, who would fulfil the offices of teacher and minister there for five years. It added much to the interest occasioned by a knot of our countrymen and their families so remotely situated, to witness the devotedness of the amiable pastor, Mr. Taylor. We accompanied him to the several cottages, where health and content prevailed without many apparent comforts. A very scanty supply of domestic furniture and utensils there was, but abundance of English farm production, such as bread, bacon, eggs, butter, milk, poultry, mutton, beef, and vegetables. For groceries and clothes they depend on a passing emigrant ship, or an American whaler, and for which they are ready to supply stock and refreshment, preferring barter to money; and ships may obtain water in their own boats, by filling casks in them by a hose connected with the cascade, while lying outside the surf, and which the young men of the settlement are always ready to assist in.

Ships are beginning to visit this island, but nothing should induce the commander of a merchant vessel to anchor, even if he should do so at the depth of 30 fathoms water, 1½ mile off, with the wind offshore; the swell which attends the brief calm preceding the change of the wind onshore (N. and N.W.) would be very likely to snap his cable, or jerk his anchor home, and be drifted on the rocky shore. He could not work off should he slip his cable, and if the onshore wind proved a gale, he must part from or founder at his anchor. The *Julia*, sloop of war, was so caught, parted, and was totally wrecked with a fearful loss of life, in 1818. But there would be no risk in holding several days' communication by boats, the ship standing off and on, especially if the season happened to be between October and April, which is the summer period here. William Glass, who was a corporal here at the time of the British occupation during Napoleon's captivity, is now upwards of seventy years of age, and sorrowfully afflicted with cancer in his under lip and chin, but was able to move about.* He was at first (in 1821) chosen as chief, and is habitually called governor. His own family consists of wife, seven sons, and eight daughters; and what with the progeny of the two old men-of-war's men, Riley and Taylor, who remained with him, and the settling of some four or five whaling men, and the marrying of the daughters of Glass and his first companions in this voluntary exile, the present population amounts, as stated, to 85. The young men and women partake of the mulatto caste, as the wives of the first settlers, Glass, &c., were natives of the Cape of Good Hope and St. Helena, but the children of the second generation are what we should term handsome brunettes of a strikingly fine figure. It is asserted that a more healthy place than this island cannot be found; that none of the epidemical diseases have reached them, and the children are not subjected to any complaints or illnesses common to children. The clergyman assured us that he had not traced a vice to contend with. We took leave of the venerable governor Glass and his boys at $7^h\ 30^m$ p.m., and as the wind had come round to N.W., we were enabled to shape a flowing course E. by S. towards the Cape of Good Hope.

The plan of the settlement Bay, to which the residents have given the name of *Falmouth Bay*, may prove of use to the future ships desirous of sighting it to correct their longitude, or to replenish water and stock. But it is dangerous to range along the margin of the island nearer than 2 miles, on account of the baffling eddies, which leave a ship in the onset influence of the swell. The settlement bay itself should not be approached within 1¼ mile, or in 40 fathoms water, a limit which is denoted by the sail rock off the western cliff, closing with the N.W. extreme of the bay and island, and which it does on the bearing of S.W. ¾ W. The islanders have no name for the north-western point, where our observations were taken at, so it was named *Herald Point*. Keeping the cross marks on of that point, and the erect rocky islet at the western extreme, the white cottage brought S.W. by S. (or the low black cliffy point at the eastern extreme of a black pebbly beack, bearing South), is the best line to run in upon, and which should be preserved whether for sending a boat on shore, while standing off and on, or for anchoring, which a steamer might do with comparative impunity. It must not be forgotten, that except the absolute eddy produced by the projection of the island at half a mile off, the current sets north-eastward. It may also be remarked, that although the peak rears its head 8,000 feet above the level of the sea, such is the conformation of its slopes, that its apex cannot be seen from the margin of the island, which preclude any vertical angle being measured from the high water mark on the cliffs. The peak is of easy access for barometer measurement, but is generally snow clad; it was so at the time of this visit, although young summer.

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* The late Corporal William Glass, who is still always spoken of as "the Governor," was evidently much respected, not only by the generation, or rather generations, born around him, but the settlers of various nations who at different periods joined him in his lonely abode. With the ordinary education of a Scotch peasant, he seems to have acquired an ascendancy which was ever exercised for the good of all. By common consent he was the patriarch of the community, being, until the arrival of the Rev. Mr. Taylor, their leader and their priest. He had no absolute authority, having been simply left as a volunteer in charge of the *Julia*'s wreck, and of some military stores, when, in 1824, the garrison, under Captain, now Major-General, Sir Josias Cloete, was withdrawn. He was a native of Kelso, and died in November, 1853, at the age of sixty-seven years, having resided on the island thirty-nine years. He is buried in front of the settlement of which he was the founder, and an appropriate inscription on a marble stone, sent by his sons from their new home in the United States, marks the spot."—*Capt. M. S. Nolloth, R.N.*

The geographic position of Tristan d'Acunha may now be considered as settled. Its north-western extremity lies in lat. 37° 2′ 48″ S., long. 12° 18′ 39″ W., about one-third nearer to the Cape of Good Hope than to Cape Horn, and nearly on a line drawn between those well-known capes, a position which places it 1,320 miles southward of St. Helena.

We close these notices with some remarks by Captain M. S. Nolloth, R.N. who came, with the Bishop of Cape Town, in H.M.S. *Frolic*, 1856.

The Rev. Mr. Taylor received us as we landed, and from him we learnt that all was well, and that they were without need of immediate assistance. The object of the *Frolic*'s visit,—to inquire after their welfare, and to remove or take steps for the eventual removal of such of them as might wish to quit the island,—was fully explained to this gentleman and to the inhabitants, who appeared much pleased with the care thus manifested for them; and due time having been given for the consideration of the nature of the opportunity presented to them in the terms of the letter of his excellency Sir George Grey, which was supplied for my guidance, and all the information having been imparted which the bishop's knowledge of the Cape Colony enabled him to supply regarding the prospects which would there await them, I received the following information chiefly from Mr. Taylor.

There are, including Mr. Taylor, seventy-one men, women, and children on the island; their numbers having been reduced by the departure, in January last, of Mrs. Glass, wife of the late Corporal Glass, with thirteen children and grandchildren, and her son-in-law, with his family of ten, in all twenty-five persons.

There are probably about 200 head of grown cattle on the island, cows and bullocks in about equal proportions, and perhaps 300 sheep and pigs, besides poultry, &c.

The area of ground fit for tillage is very limited, and the soil is easily exhausted: it is very seldom that an attempt has been made to raise a second crop from the same plot: it requires considerable manuring after having been once used, and it is found more profitable to clear fresh ground each time. The only crop which flourishes here is the potato, but the high winds of spring and a grub which makes its appearance in prodigious numbers during the autumn, are very destructive to this root, on which the islanders chiefly depend for food and for the various necessaries of life which they receive in exchange from American whalers, whose visits would cease with the failure of this supply. The introduction of the potato disease, to prevent which every possible care is taken, would almost reduce them to starvation.

They have at present abundance of wood, but for some years past it has been, by decay, diminishing in quantity and quality, owing to a disease which first showed itself about seven years ago.

The islanders consider that more than 200 persons could scarcely subsist with any degree of comfort on the settlement.

The visits of the whalers are gradually becoming less frequent, which increases the difficulty of bartering as advantageously as formerly for clothing and other absolute necessaries.

The heads of families, without exception, feel greatly the absence of all prospect of providing properly, viz., decently and comfortably, for their children here, and the impossibility of settling them, especially their daughters, in life, and it seems desirable that the young men should be removed to some place where they would have a better chance of training themselves for the ordinary occupations of life.

DIEGO ALVAREZ, OR GOUGH'S ISLAND.

This island appears to have been discovered and originally named by the Portuguese; but having been seen by Captain Charles Gough, in the *Richmond*, bound to China, 1731, it has since borne his name. Captain Heywood, in the *Nereus*, visited this island on the 8th of January, 1811, and made the longitude, by his chronometers, 2° 18′ East from Tristan da Cunha; this gives the long. 9° 45′ W. By a mean of observations and chronometers in nine other ships, its centre has been given in 40° 19¼′ S., and 9° 41½′ W. Captain Broughton, in 1795, gave the lat. as 40° 19′, and the long. as 9° 27′ or 9° 30′; but he observes that at the time the horizon was very confused; and other ships have given the longitude nearly the same. The *Coutts*, Capt. Robert Torin, in 1800, made it, by lunars, 9° 46′.

Captain Heywood found the summit of this island to be 4,380 feet above the level of the sea. The surface of the isle was mostly covered with a light coat of mossy grass. In some places were a few small bushy trees, like those of Tristan da Cunha. The cliffs rise precipitously from the sea, and from their fissures issue several beautiful cascades of water. At a cove on the North side of the island the boat landed with safety, just to the eastward of one of the rocky islets adjoining that side of the island.

Near the N.E. point of the island is a rock exactly resembling a church, with a high spire on its western end, and therefore called the *Church Rock*. To the southward of this rock, on the East side of the island near the shore, there is an islet, within which the landing is safe and easy, it being protected from the swell and northerly winds by the N.E. point. Here several Americans resided, but they had been unsuccessful during a long stay, most of the seals having deserted the island; but plenty of fish were procured; and birds of good flavour were caught, by lighting a fire upon one of the hills in the night.

The Americans said a ship might anchor in safety between the islet and the S.E. point of Gough's Island, at about half a mile from shore, in about 20 fathoms, tolerably good ground.

In December, 1813, H.M.S. *Semiramis* visited this place and found it deserted.

Captain Morrell has noticed that boats may land with perfect safety in the cove above mentioned, when the wind blows from any point South of N.W. and East. Here water may be obtained with ease, by running the vessel close in to the front of the cove, where she can anchor in 12 or 14 fathoms, with the huts at the head of the cove bearing S.S.W., and the North and easternmost islet bearing about N.W. There is a safe passage between these islets and the main island, with 15 fathoms of water over a rocky bottom. This island used to abound with fur seal, and sea elephants, but they were so much annoyed by their relentless persecutors, that they have sought more safe and distant retreats.—*November*, 1829.

BOUVET'S OR CIRCUMCISION ISLAND.

This island was discovered by M. Louzier Bouvet, in the French frigate *L'Aigle*, accompanied by *La Marie*, on the 1st of January, 1739. The particulars, with a plate, were published by Mr. Dalrymple, in his collection of 1775.

Between the parallels of 48° and 49′ S., and in about 7° of longitude East from Tenerife (9° 40′ West of Greenwich), the fogs commenced, and became so thick that the two ships could not see each other at the distance of a pistol shot. On advancing more to the South these fogs were frequent.

On the 15th of December icebergs were seen, some appeared to be 100 fathoms high above the water. Much drift or broken ice was met with, and the ships luffed up, in order to avoid damage. Some icebergs, subsequently seen, were supposed to be 200 fathoms in height. The navigation became dangerous; and for many days that the ships were in these seas, the masts, cordage, and sails, were covered with ice.

On the 1st of January, 1739 (the festival of the Circumcision), at 3h p.m. the ships, in 54° 20′ of latitude, and longitude, as *computed*, 25° 47′ E. from Tenerife (9° 7′ W. from Greenwich), land was seen to the E.N.E. at 8 or 10 leagues. It seemed very high, covered with snow, and surrounded with ice, to a considerable distance. On the 2nd of January, the ships having proceeded more to the S.S.E., the western part of the land bore N.E. about 13 leagues. On the 4th they had advanced to 5 leagues from the land, which, high and rugged, bore E.N.E., and they finally lost sight of it on the 9th, leaving it to the southward. It appeared to be an island, about 5 miles in length W.N.W. and E.S.E.

Notwithstanding the preceding description, this land was for a time given up as imaginary only. Captain Cook sought for it without success in 1775; on the 16th of February he came up from the southward, under double reef topsails and courses, having a very fresh gale, with snow and sleet. On the 17th he was in 54° 20′ S., long. 6° 33′ E., and thence proceeded to the eastward, with a prodigious high sea from the South. He continued his course to the eastward until the 21st, and concludes his description of the route with this observation:—

"We had now run down thirteen degrees of longitude in the very latitude assigned for Bouvet's Land. I was, therefore, well assured that what he had seen could be nothing but an island of ice; for, if it had been land, it is hardly possible we could have missed it, though it were ever so small. Besides, from the time of leaving the southern lands, we had not met with the least signs of any other. But, even supposing we had, it would have been no proof of the existence of Cape Circumcision; for I am well assured that neither seals nor penguins, nor any of the oceanic birds, are indubitable signs of the vicinity of land. I will allow that they are found on the coasts of all these southern lands; but are they not also to be found in all parts of the Southern Ocean? There are, however, some oceanic or aquatic birds which point out the vicinity of lands, especially shags, which seldom go out of sight of it; and gannets, boobies, and man-of-war birds, I believe, seldom go very far out to sea."

Notwithstanding the evidence of the existence of this island, the magnetic expedition under Captain Sir J. C. Ross sought for this island in vain. "On the 17th of March, 1843, they reached the latitude of Bouvet's Island, 54° 19′, about 8° to the westward of the assigned position; but they, like Cook, searched for it in vain: and Captain Ross concludes that Bouvet had been deceived by the form of an iceberg. The last berg was seen on the 25th, in lat. 47° 3′ S., long. 10° 51′ E."—*Naut. Mag.*, October, 1843, p. 678.

Whoever refers to our chart will perceive, by the track of Captain Cook, that he advanced from the southward *a little too far to the East.* He was misled by the original longitude of Bouvet. This is clear; for Captain Lindsay, in the *Swan*, descried the land on the 6th of October, 1808, which was found to be high and covered with snow. From this time to the 11th he made every endeavour to get close to the land, but found that it could not be approached within 3 miles, being surrounded by a mass of solid ice. The situation of the ship was, at times, perilous; it being in darkness and beset with loose masses and floating islands of ice.

The existence of this island has been proved by another vessel, the *Otter*, from which it was seen nearly at the same time, October, 1808.

From the observations taken in the *Swan*, the island appears to lie in 54° 16′ S., and 6° 14′ E. It appeared to be about 5 miles in extent, from East to West. The West end, which is very high, is now called *Dalrymple's Head.* It has been suggested as probable, that the isle may be approached in January or February, or during the summer of the southern hemisphere.

The island was visited in December, 1832, by Captain Morrell, who observes that it lies nearly true East from South Georgia, being in lat. 54° 15′ S., long. 6° 11′ E., about 400 [430] leagues S.S.W. (true) from the Cape of Good Hope. We continued our course, with variable winds and occasional heavy weather attended with much snow and hail, until Friday, December 6, when we saw the island for which we were bound, bearing E.S.E. distant 1 league. This was at 2ʰ p.m., and at 3ʰ the next morning I sent the second mate with a well-manned boat to search for seal on the shores of the island. At 7ʰ a.m. the boat returned with 80 fur seal of a superior quality; and the officer reported that the seal were perfectly tame; so much so that they would come up and play among the men who were skinning their companions.

Here, on the western shore, was fine anchorage, inside of an immense number of ice islands, lying from 1 to 3 miles off shore; all of them aground in from 10 to 100 fathoms of water. Some of these ice islands were a mile in circumference, and lay so close to each other that it was with difficulty the vessel was got between to the anchorage: but here, on the N.W. side of the island, in 17 fathoms of water, she anchored, about half a mile from shore, entirely sheltered by the ice islands on one side, and Bouvet's Island on the other, from every point of the compass.

At 9ʰ a.m. the boats returned with 112 clap-match and wig-skins; on the morning of the 8th, at 3ʰ a.m., they were again sent to examine the island, and discover new rookeries; but, after sailing completely round, not another spot could be found on which a seal could land; the shores being either perpendicular or covered by projecting cliffs.

This island, adds Captain Morrell, is evidently of volcanic origin; even the rocks having been melted by former eruptions into a complete mass of lava, presenting the appearance of blue and green glass. There are some small spots of vegetation on the hill sides; but the mountain, which rises about 3,000 feet above the level of the sea, is covered with pumice-stone, that spongy light crumbling substance, which is generally cast out from the volcanic craters of burning mountains. Who can declare how many ages have elapsed since the fires were extinguished which once raged in the bosom of this mountain!—He, alone, who laid the foundations of the earth.

The shores of this island abound with fish, and innumerable oceanic birds frequent the rocks and icebergs in their breeding season. I have no doubt that there is some other land in the vicinity of this; and I think the most likely place to seek for it would be to the South.

At 7ʰ p.m. on Sunday, Dec. 8, we got under way, and left this inhospitable island; steering to the South and East, with a fine breeze from the S.W. and fair weather, which continued until Thursday, the 12th, when the wind commenced blowing a strong breeze from the N E., attended with a thick snow storm.

On the next day, the 12th, being in lat. 60° 11′, long. 10° 23′ E., the wind moderated, and the weather became clear; at which time we found ourselves in the midst of a vast field of floating ice, from which arose, in almost every direction, elevated islands, or rather floating mountains, of the same glittering material. Our situation now was extremely perilous, while the prospect around us was at once appalling, sublime, and beautiful. All that we have ever read of fairy palaces, and castles with towers of crystal, surmounted by turrets and minarets of the whitest silver, may furnish some idea of the scene of treacherous brilliancy which now surrounded us. The morning sun shone upon them obliquely, and their irregular sides reflected its rays in a variety of gay colours; but we were not so much dazzled by their beauty as alarmed at their proximity, as large masses of ice and snow were frequently falling from their summits with a tremendous crash on the field ice below, of magnitude and weight sufficient to sink a ship of the largest size, should such a one unfortunately be found in the line of its descent. Happily for us it was nearly calm."—Pages 58, 60.

According to the logbook of the *Sprightly*, Captain Norris, a vessel belonging to the honourable firm of Enderby's, the following passage, quoted by Sir John Ross, refers to this vicinity:—December 10th, 1825. The island is in lat. 64° 15′ S., long. by chron., 5° E., and as we are now certain it is an island, we name it Liverpool Island. It appears to extend 3 or 4 leagues from North to South; the North end is rugged, the South end low, the middle high and covered with snow. The sharpness of the rocks, and the weather coming on thick with much sleet and snow, was the whole and sole reason for not making successful landing.

On December 13, 1825, they met with another island. "This island, which we have named Thompson Island, bears about N.N.E. 15 leagues from Liverpool Island. There are also three rocks, which we named the Chimneys, to the S.W., 4 or 5 miles from Thompson Island, and another rock 3 miles to the southward of them. This island is in lat. 53° 56′ S., long. 5° 30′ E. On December 16th they sounded on the South side of the island, and found from 35 to 20 fathoms, black sandy bottom, at a mile from the shore. Caught a number of small fish, resembling codfish. On the 18th they landed from the boats, but stormy weather immediately following, they could not regain the ship till the 24th, having killed only 48 seals. The S.W. point is the only place which affords a landing, as the boats went entirely around the isle, and nothing but perpendicular rocks could be seen; it bears evident marks of having been a volcano, as it is nothing less than a complete cinder, with immense veins of lava which have the appearance of black glass, though some are streaked with white."

From these statements it appears that there is more than one island, but not in the positions given, as Sir James Ross passed so near them that he must have seen them, had they been correctly stated. That they do exist *somewhere* seems morally certain, and that the islands seen by Bouvet, Norris, and Lindsay may refer to three separate localities; that there are two, is obvious from Captain Norris's statement. Their character must be left for future determination.

THE FALKLAND ISLANDS.

The **Falkland Islands**, situated between 51° and 53° South latitude, and 57° and 62° West longitude, consist of two principal islands, the East and West Falkland, with a considerable number of others, of different sizes, clustered around them and in the straits between them.

The greatest length of East Falkland is about 95 miles, the mean, 85; the greatest breadth about 53 miles, the mean may be averaged at 40 miles. The West Falkland is about 80 miles in length; the width varies considerably, but 40 miles may be considered the greatest, and 25 miles the mean.

The remaining islands, about 200 in number, vary very considerably, from 16 miles in length by 8 miles in breadth, to mere islets of half a mile in diameter.

The sovereignty of the Falklands is now vested in the British crown; but the title has been subject of much dispute, and has occasioned much dissertation. The following short history, collected from Captain FitzRoy and others, will explain the grounds on which the various claims rest.

It has been asserted that Americus Vespucius, then employed by the King of Portugal, saw these islands in 1502; but if the account of Americus himself is authentic, he could not have explored further South than the right bank of La Plata. If the Portuguese, or any other people, actually traced, or even discovered, portions of coast South of the Plata before 1512, it appears strange that so remarkable an estuary, 120 miles across, should have been overlooked, especially as soundings extend 200 miles seaward of its entrance; and that the world should have no clear record of its having been discovered prior to the voyage of Juan de Solis, in 1512. Vespucius has already robbed Columbus, and his predecessor Cabot, of the great honour of affixing their names to the New World: shall he also be tacitly permitted to claim even the trifling distinction of discovering the Falkland Islands, when it is evident he could not have seen them?

On the 14th of August, 1592, John Davis, who sailed with Cavendish on his second voyage, but separated from him in May, 1592, discovered the islands now called Falkland.

In 1683—84 Dampier and Cowley saw three islands in lat. 51° to 51° 20′ S., which they (correctly) supposed to be those seen and named by Sebald de Weert. It was called by the editor of Cowley's narrative PEPY'S ISLAND, in compliment to the then Secretary of the Admiralty.

Sir Richard Hawkins sailed along the northern shores of these islands in 1594, and he, ignorant of Davis's discovery, named them HAWKINS' MAIDEN LAND. His account appearing first and prominently before the public procured for them the name by which they were known, until Strong, in 1690, sailed through, and anchored in the channel, which he named Falkland Sound. How it happened that the name FALKLAND, originally given to the sound alone, obliterated Hawkins, and has never yielded to Davis, is now a matter of very trifling importance.

Several ships of St. Malo passed near the Eastern Falklands between the years 1706 and 1714, from whose accounts M. Frézier compiled his chart, published in 1717. In consequence of the visits of these ships of St. Malo, the French named the islands LES MALOUINES. The Spaniards adopted the French name, slightly altered by changing Malouines into Malvinas.

During the early part of the last century France maintained a lucrative commerce with Chilé and Peru by way of Cape Horn, and the advantages of a port at the eastern extremity of the Falklands did not escape her active discernment, and at the commencement of 1763 the court of France determined to form an establishment at them. De Bougainville proposed to commence it at his own expense, and accordingly set out from St. Malo with an armament and settlers. On the 17th of March, 1764, having arrived at the Falklands, Bougainville decided to place his establishment at Port Louis on the spot where the present settlement stands, and forthwith commenced operations.

On the 23rd of January, 1765, these islands were taken possession of for the British Crown by Commodore Byron, and in consequence of his favourable report, Captain Macbride was sent out in H.M.S. *Jason* to begin their colonization. He arrived at Port Egmont in January, 1766.

Spain laid claim to the islands immediately after the French settlement, which was given up to Spain on April 1st, 1767, who indemnified the settlers.

In 1770 a Spanish armament attacked the British colony at Port Egmont, and obliged it to surrender, but it was restored by the Spanish government. It was forsaken, however, in 1774, but the signals of possession were left flying.

Spain afterwards withdrew from the islands, and left them uninhabited, probably at the commencement of the present century, and thus there was no person left who claimed even the shadow of authority over them.

From these short notices it will appear evident, that if discovery and prior occupation gave a title to new and uninhabited countries, they undoubtedly belong to Great Britain; for Davis first discovered them; Hawkins first named them; Strong first landed on them; and (excepting the French) Byron took possession of them; and (again excepting the French) Macbride first colonized them. And with respect to the French claim, it was, as before stated, resigned for ever to Spain. The right of sovereignty, therefore, rests between Spain and England; and Spain's only claim rests upon the unstable foundation of a papal bull.

The islands remained uninhabited and unclaimed until the month of November, 1820, when Commodore Jewett, then commanding the *Heroine* frigate, took formal possession of the islands in the name and by the authority of the United Provinces of South America, or government of La Plata, otherwise Buenos Ayres. This act of the Argentine Republic was scarcely known in Europe for many years, and it is difficult to see upon what reasonable grounds they rested their claim.

In 1823 the Buenos Ayrean government took another step in the appointment of a "comandante de las Malvinas;" and in the same year, Don Louis Vernet, a German by birth, solicited and obtained from them the fishery and cattle on the eastern island, and land for a settlement. This did not prosper, and in the next year M. Vernet sailed himself in a second expedition. In 1828 the government of Buenos Ayres granted to him (with certain exceptions) the right of property in the Falkland Islands, and in Staten Land; with entire and sole right to all its soil, cattle, horses, hogs, fisheries, &c.

"The total number of persons on the island consisted of about one hundred, including twenty-five Gauchos,* and five Carruas Indians. There were two Dutch families (the women of which milked the cows and made butter); two or three Englishmen; a german family; and the remainder were Spaniards and Portuguese, pretending to follow some trade, but doing little or nothing. The Gauchos were chiefly Buenos Ayreans, but their capitaz or leader was a Frenchman."

In 1829 Vernet warned off some North American sealers; and in 1831, upon their repeating the sealing excursion, of which he had complained, he detained them by force. This act, and the circumstances arising out of it, drew upon him and his unfortunate colony the hasty indignation of Capt. Silas Duncan, of the United States corvette *Lexington*, who, on his own responsibility, surprised, assaulted, and made prisoners of many unoffending people, and unwarrantably destroyed both property and buildings. M. Vernet was at the time absent at Buenos Ayres, attending the trial of the sealers in question; but Mr. Brisbane, and several others, were put into irons and carried away on board the Lexington to Buenos Ayres, where they were delivered up to the Buenos Ayrean government, in February, 1832. The United States government supported their officer, and formally demanded a full reparation of the wrongs done to their citizens. While the United States and Buenos Ayres were discussing the question at issue, Great Britain, following up the solemn warning she had given to Buenos Ayres, issued orders to the commander-in-chief on the South American station to re-assert her sovereignty of the Falklands.

Accordingly, Commodore Onslow, in H.M.S. *Clio*, hoisted the British flag at Port Louis, on January 2nd, 1833, while, about the same time, H.M.S. *Tyne* anchored in Port Egmont, on the Western Island. The small Buenos Ayrean garrison quietly withdrew, and sailed for the Plata. Shortly before, this garrison had mutinied, and had barbarously murdered their commanding officer. Having proclaimed the Falklands to belong to Britain, they departed, leaving the flag in charge of an Irishman, who had been Mr. Vernet's storekeeper.

In March, 1833, Captain FitzRoy, in the *Beagle*, anchored in Berkely Sound; he found the island in a very disordered state from the want of government. During his stay, Mr. Brisbane returned as the agent for Mr. Vernet's private affairs. The whole colony was a miserable ruin, caused by the *Lexington's* visit; and on the 6th of April he left the islands with dismal forebodings from the disordered state of society, and these were exceeded by the sad reality.

In a despatch, dated November, 1833, it appears that eight Gauchos and Indians of bad character, on the 26th of August in that year, had attacked and brutally murdered Mr. Brisbane, Dickson the person in charge, and three other principal persons; after which they pillaged the houses and plundered the place of whatever it contained, and drove off all the cattle and horses up the country, laden with their booty. Thirteen unarmed men, three women, and two children, remained in the town two days with the murderers, and then escaped to one of the islands in the bay, where, until relieved by the English sealer *Hopeful*, they lived upon birds' eggs and fish. The murderers were subsequently taken and sent to Buenos Ayres.

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* The *Gauchos* are the hunters of South America, celebrated for their horsemanship, and for the use of the *bolas* and the *lasso*, with which they catch wild horses and cattle.

On the 10th of March, 1834, Captain FitzRoy again visited Berkeley Sound: the settlement looked more gloomy than ever, and not far from the house where he had lived they found, to their horror, the feet of poor Brisbane protruding above ground. So shallow was his grave, that dogs had disturbed his mortal remains, and had fed upon his corpse. This was the fate of an industrious, honest, and most faithful man.

At the beginning of the year 1834, Lieutenant Henry Smith, R.N., was appointed governor of the islands, accompanied by a small party as the nucleus of a future colony. The old settlement at the head of Berkeley Sound was fixed upon as the head quarters. On the 23rd of August, 1841, Lieutenant R. C. Moody, R.N., was appointed lieutenant-governor, and arrived in Port Louis on January 15th, 1842.

This energetic governor endeavoured to draw attention to and develop the resources of the Falkland Islands, and the seat of government was removed from Port Louis, at the head of Berkeley Sound, to Stanley Harbour, in Port William; the former, though an excellent and easily reached anchorage, being further removed from the line of route than was necessary.

The principal feature in the recent progress of the Falkland Islands is the occupation of a portion of East Falkland by a commercial company. In the year 1844 Mr. Samuel F. Lafone, who had been extensively engaged in the hide and cattle trade on the River Plate, after some preliminaries, entered into negotiations with Her Majesty's government in 1845, for a contract to purchase the southern portion of the East Falkland, the islands adjacent, and the Beauchene Island, and the cattle upon the Falklands, upon the payment of £10,000 at the period,, and £20,000 in ten years from January 1st, 1852. In May, 1851, a company was formed in London to carry out more fully the scheme of turning the advantages of the islands and their herds of wild cattle to greater account. It was incorporated by royal charter, and purchased Mr. Lafone's interest for £30,000; and subequently an extension of the term of dominion over the wild cattle was granted until January, 1860. The company's chief locality is at Stanley, but their operations are conducted in different portions of their domain.

GENERAL DESCRIPTION.[*]—The whole group of the Falkland Islands is deeply and variously indented by sounds, bays, harbours, creeks, and islets. Perhaps there is no spot in the whole world so singularly irregular in its coast line, and so full of harbours and creeks as the Falkland Islands. This formation diminishes the area considerably, but at the same time it presents more than counterbalancing advantages.

The area of East Falkland may be roughly computed at about 3,000 square miles; the area of West Falkland may be estimated at about 2,000 square miles; and the whole group, East and West Falkland, with all the surrounding islands, at about 6,000 square miles.

The sovereignty of the Falklands, as before stated, is now vested in the British Crown, and their local administration is conducted through the medium of a governor, who resides at Stanley, aided by the usual staff of officials.

A small detachment of British troops, under command of an officer, are stationed in the settlement, and it is the duty of the admiral of the station to visit the colony periodically, for the protection of commerce, &c.

These islands, though by geographical position of the greatest importance to the mercantile world, were but little regarded up to 1851, when the Falkland Islands Company was incorporated under royal charter from the British fort, to open the resources of the East Falkland Island, by a large grazing undertaking, which necessitated the establishment of stores, artificers, &c., at Stanley, whereby the settlement has been gradually improving, until at this time ships can be provided in every way much cheaper than at any of the ports in South America—a desideratum that cannot be too widely known, seeing that these islands are situated exactly where their numerous and splendid harbours, particularly that of Stanley, afford protection and opportunity for the repairing of injuries sustained by shipping passing in the vicinity of Cape Horn, where a larger amount of annual injury is done by severe weather than in any other locality.

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[*] For the subsequent general outline we are indebted to Geo. H. Cripps, Esq., the Secretary of the Falkland Islands Company.

Both the East and West Falkland are very irregular in their coast line: perhaps there is no part of the world where so many good harbours exist along so short a distance of sea board. Their total area may be computed at about 5,000 square miles; the former comprising about 3,000. The two islands are divided by a strait containing several small islands, and its navigation requires great care, for though well surveyed, and all known dangers clearly defined upon the charts, the currents are very strong, and the wind increases with unusual rapidity.

In their general aspect these islands have few features of interest to remark upon. The southern portions of the East Falkland are so low that they are hardly perceptible from the deck of a ship at 5 miles distance. The western island is more marked, some of the hills being between 2000 and 3000 feet above the sea level.

There are no trees upon these islands, and the only shrub that has yet been known to thrive is what they term the tea plant, which is abundant, the leaves being used for making a decoction somewhat similar to tea. The berry of this shrub is of a rose-colour, and the flavour is appreciated. Celery (an excellent antiscorbutic) grows in wild luxuriance, and European vegetables thrive well wherever they have been tried.

Cereals have been grown, but the absence of sufficient sun for ripening them precludes the prospect of their being cultivated with success.

Peat exists of good quality everywhere, and is generally used for fuel. Substances, having somewhat the appearance of coal, have been found in various localities, but from their analysis, and from the opinion of geologists, there is every reason to suppose that bituminous coal does not exist.

Cattle and sheep of European breeds appear to thrive remarkably well. The former are small, but improving in size from bulls introduced by the Falkland Islands Company, and their flock of cheviot sheep, now numbering about 20,000, yield fleeces weighing as high as 10 or 12 lbs., and as good mutton as any in the world, but, from the paucity of demand, it only realizes about 3d. a pound.

It is to this circumstance that the shipping community are indebted for Port Stanley having become the best port of refuge for ships between Valparaiso on the West coast of South America and Rio Janeiro upon the eastern side. For, in order to attract more shipping, and thereby more consumers for their otherwise unprofitable staple, the Falkland Islands Company have opened establishments at Stanley for the supply and repair of ships, upon the lowest scale that can be adopted without loss; and they seem determined to spare no effort to carry out their object, which has been materially assisted by the British government having placed a lighthouse at the eastern extremity of the East Falkland, which makes the splendid harbour of Stanley easily accessible by night or day; moreover the port is free from charge of any sort, and fresh water is supplied by the port at 2s. 6d. per tun.

These islands have no native inhabitants or wild animals of any kind, except rabbits and rats, but water fowl of many sorts are abundant, affording both amusement and good eating for the inhabitants of Stanley. Penguins contribute eggs in great abundance, which are esteemed a luxury. The penguins have of late years become in request for their oil, which is little inferior to that taken from the seals, which abound on several of the adjacent islands, and afford occupation for a hardy class of sailors, who go out in small vessels, and earn considerable sums in the hazardous pursuit of them.

Fish are very abundant in the creeks, and efforts have been made to salt a species of mullet for the markets in South America, but whether from the climate being unsuitable, or any peculiarity in the fish, they assume a colour that is prejudicial to their sale.

Fresh water is abundant upon the two large islands; not so upon the smaller ones, which render them for the most part unfit for grazing purposes.

The country in the northern part of the island is rather mountainous. The highest part, called *San Simon*, 1,600 feet, is at no great distance from the bottom of Berkeley Sound.* The tops of the mountains are thickly strewn with large boulders, or detached stones, of which quantities have fallen in some places in lines along their sides, looking like rivers of stones; these are alternated with extensive tracts of marshy ground, descending from the very tops of the mountains, where many large fresh water ponds are found, from 1 to 2 feet deep. The best ground is at the foot of the mountains, and of this there is abundance fit for cultivation, in plains stretching from 5 to 15 miles along the margin of the sea. In the southern peninsula, since called *Lafonia*, there is hardly a rising ground that can be called a hill. Excellent fresh water is found everywhere, and may be procured either by digging or from the rivulets, which flow from the interior toward the sea, through valleys covered with a rich vegetation.

Of rivers there are but few in the Falkland Islands. The San Carlos, in East Falkland, is the largest known one; it is very winding, and only about 30 miles in length, navigable for boats to a distance of about 8 miles, and for that distance the width may be averaged at 100 yards.

The sources of the San Carlos appear to be many small streams, draining all the country to the West and S.W. of the western extremity of Port San Salvador, also part of the country to the northward. It is in general a deep stream, with high banks. The bed is of a red sand, gravel, and in spots muddy.

The Arwyo Malo, or Matson River, is another large stream, which drains the long valley, separating the Simon Range from the Wickham Heights. It rises at the foot of Mount Usborne, and running in an easterly direction falls into an arm of Port San Salvador, a distance of 18 miles. It is not navigable; and as it is completely a mountain stream, it often becomes difficult and dangerous to cross, by reason of sudden floods swelling it into a deep and rapid river.

WEST FALKLAND.—The Western Island is divided from the Eastern by Falkland Sound, or rather Strait, a name given by our countryman, Strong, in 1690, and which subsequently became applied to the whole group. The north-western side of the island has been much frequented by whale fishers and sealers, and still continues to be so, though the indiscriminate slaughter of these animals has much reduced their numbers, and rendered the fishery less lucrative than formerly. Their chief rendezvous is at New Island.

From the coast the island appears upon the whole to be more hilly, and the hills to be more rounded, lumpy, and isolated than those in the East Falkland. They appear to possess the same geological character, viz., varieties of quartz rocks; and their height may be assumed as varying from 800 to 2,200 feet.

The principal range, the Hornby Hills, is on the eastern side of the island, and runs in a contrary direction to those in East Falkland, its general bearing being North and South, and extending from White Rock Harbour to Fox Bay, parallel to the coast line. Mount Maria, at the back of Port Howard, is 2,270 feet in height.

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* A chain of very rugged topped mountains, called the *Wickham Heights*, extends due East and West from Port William to Port Sussex, nearly across the northern portion of the island, to the southward of Mount St. Simon above mentioned. The height of this range varies from 1,400 to 2,300 feet (increasing towards the West side); and as the quartz rock crops out nearly vertical, and with great irregularity, this range can only be crossed at certain places, which constitutes a feature of some importance in relation to the drives of cattle. The contrast between the country North and South of the Wickham Heights is very remarkable.

There is also a very remarkable rugged ridge of quartz rock, about 150 feet in height which rises abruptly from the sea, and follows the coast line from above Port Howard to Fox Bay, a distance of about 40 miles. Between this ridge and the range of hills is a longitudinal valley, intersected occasionally by high land (the roots of the range).

The North coast of West Falkland consists of long islands extending East and West, with narrow openings between them, of which Tamar Pass and the entrance to Port Egmont are the most remarkable. Upon these islands are isolated hills, of conical and lumpy forms, rising abruptly from gently undulating ground. The islands further to the westward, called the Jasons, are hills of this abrupt character, and from 800 to 1,200 feet in height.

The West coast of West Falkland, until Captain FitzRoy's survey, was not much known, except to whalers and sealers. It is more variously and deeply indented by the sea than even the coasts of East Falkland. The hills on the South coast of West Falkland appear to be in masses, and their termination at the coast line to be in lofty rugged cliffs. There is a river, the Chartres River, about the same size as the San Carlos in East Falkland, which falls into King George's Bay. Rivers, however, can scarcely be needed in a country so fully and variously indented by the sea as these islands are. For the purpose of fresh water, the want of rivers is amply supplied over the whole country by many small fresh water lakes or ponds, varying in size from 30 yards to 3 or 4 miles in circumference, and by innumerable springs and rivulets.

PRODUCTIONS, &c.—One of the most remarkable of the plants that grow on the Falklands is the Tussac; it is a gigantic sedgy grass; the average length of the blade is 7 feet, and of the stalk 4 to 6 feet. The plants grow in bunches close together, and as many as 250 roots spring up from one bunch. In old plants the decayed roots of successive shoots form a cushion of dry entangled fibres, which raise the bunch from the ground. This cushion sometimes attains to a great size and height, 6 or 7 feet, and 4 or 5 feet in diameter, so that a person standing in a patch of old tussac may be quite sheltered or concealed. It grows with great luxuriance on the coasts, down to high water mark; and cattle and horses feed on it with the greatest avidity, and speedily become fat. About 3 or 4 inches of the roots are very agreeable to man, being crisp and of a nutty flavour, and was the food of two Americans who were upon the Western Island for fourteen months. It is an exceedingly valuable plant to the colony. The grass, growing in large tufts upon the high base of decayed roots, resembles at a distance a diminutive grove of thickly clustered palms; and from the dark green and luxuriant appearance given to the smaller islands clothed with tussac, the richness of tropical vegetation is forcibly recalled to the memory.

There are no trees, but there are some small bushes before mentioned, which are used as fuel, and a few vegetables.

The large round gum plant, common in Patagonia, &c., is abundantly found, and when dried, is useful for kindling fires, being extremely combustible. A gum exudes from it, which is called "balsam," and is used as a curative. Peat is abundant, and may be easily procured for firing.

Winds, Climate, &c.—In a former portion of the work we gave a general description of the climate of these islands. The following remarks will be found important in connexion with those previously given. The first are by Capt. FitzRoy.

Wind is the principal evil at the Falklands; a region more exposed to storms, both in the summer and winter, it would be difficult to mention.

The winds are variable—seldom at rest while the sun is above the horizon, and very violent at times; during the summer, a calm day is an extraordinary event. Generally speaking, the nights are less windy than the days; but neither by night nor by day, nor at any season of the year, are these islands exempt from sudden and very severe squalls; or from the gales which blow heavily, though they do not usually last many hours.

It has been stated by Bougainville and others, that in summer the wind freshens as the sun rises, and dies away about sunset; also the nights are clear and starlight. The information I have received, with what I have myself witnessed, induces me to agree with the first of these statements in its most general sense, and to a certain degree I can admit the second; but, at the same time, it is true that there are many cloudy and very windy nights in the course of each year, and I might almost say month. The *Magellan* was driven from her anchors, though close to a weather shore, in the narrowest part of Berkeley Sound, and totally wrecked in Johnson Harbour, about midnight on the 12th of January, 1833.

The prevalent direction of the wind is westerly. Gales, in general, commence in the north-west, and draw or fly round to the south-west; and it may be remarked, that when rain accompanies a north-west wind, it soon shifts into the south-west quarter, and blows hard.

Northerly winds bring cloudy weather; and, when very light, are often accompanied by a thick fog; it is also worthy of notice that they almost always occur about the full and change of the moon.

North-east and northerly winds bring gloomy overcast weather, with much rain; sometimes they blow hard and hang in the N.N.E., but it is more common for them to draw round to the westward. South-easterly winds also bring much rain; they are not frequent, but they blow hard, and as the gale increases it hauls southward. During winter the winds are chiefly from the north-west, and in summer they are more frequently south-west. Though fogs occur with light easterly or northerly winds, they do not often last through the day.

Gales of wind, as well as squalls, are more sudden, and blow more furiously from the southern quarter, between south-west and south-east, than from other directions.

Wind from the East is rarely lasting or strong; it generally brings fine weather, and may be expected in April, May, June, and July, rather than at other times; but the intervals of fine weather (short indeed), with light breezes from E.S.E. to E.N.E., occur occasionally throughout the year.

Neither lightning nor thunder are at all common; but when the former occurs, easterly winds are expected to follow. If lightning should be seen in the south-east, while the barometer is low, a hard gale from that quarter may be expected. South-east and southerly gales last longer than those from the westward, and they throw a very heavy sea upon the southern shores. In the winter, generally, there is not so much wind as in the summer; and in the former season the weather, though colder, is more settled and considerably drier. In different years seasons vary so much, that those who have been longest about the islands hardly venture to predict what weather will be found during any particular month. All they say is, that January, February, and March, though warmest, are the windiest months; and that May, June, and July, though cold, are much less stormy.

I must here add one word in favour of the barometer, or sympiesometer. Every material change in the weather is foretold by these invaluable instruments, if their movements are tolerably understood by those who consult them, and if they are frequently observed. Mr. Low said to me, "The barometer is worth anything in these countries" (alluding to Tierra del Fuego, as well as the Falklands); "some say they dislike it because it is always so low, and foretelling bad weather; but how often do we have any other?" They must somehow think the barometer ominous, and overlook the use of the omen.

The temperature may be considered equable; it is never hot, neither is it ever very cold; but the average is very low; and in consequence of frequent rain and wind, a really moderate degree of cold is much more noticed than would probably be the case if the weather were dry and serene.

Thus far Captain FitzRoy; in addition to this, we give the experience of Lieut.-governor Moody, as stated in his report to the Colonial Secretary, April, 1842, p. 22. The temperature is more equable than in England, seldom rising to the same heat in summer, nor falling so low in winter; it ranges from 30° to 50° in winter, and from 45° to 70° in summer; but during the past summer (which, by the united testimony of every person in the settlement, has been an unusually inclement one) the temperature only once reached 70°, and was seldom above 65°.

In Captain FitzRoy's work it is stated that the temperature has been known to be as low as 22° in winter, and as high as 80° in summer. The logbook of the settlement shows the temperature to have been as low as 18° one night during last winter. There are conflicting opinions about the temperature, and, as much depends upon the position of the thermometer, and the regularity of the observations, I cannot give an opinion as to which is the most accurate. My own observations will be the mean of five thermometers, but the position of the house is elevated and exposed.

There is but little ice or snow in the winter; the first seldom exceeds half an inch in thickness, excepting in very severe winters; the latter is rarely more than ankle deep, and remains a very short time upon the lower lands. There is very little foggy weather, and thunder and lightning are extremely rare.

Light passing showers are frequent, but a day of constant rain seldom happens. The total amount of rain which falls in the year is probably less than in England, certainly not more.

The prevailing direction of the wind at the Falkland Islands is from the West. From its almost daily occurrence and frequency from one quarter, it may be compared to the regular breezes in tropical climates: like them also it generally commences at nine, blows strong, often amounting to a gale through the day, and dies away at four or five in the afternoon. The nights are generally calm, and the contrast of the bright still early mornings and calm evenings with the stormy midday is very great; so frequently is this the case, that I arranged my working parties, at least those connected with the water, accordingly. I have, however, seen many days perfectly calm and serene throughout, during a residence of three months, and in a summer admitted by every one to have been unusually bad. It is also true that there have been many nights and days stormy throughout.

I have before me two accounts of the direction of the winds at different times of the year, and the kind of weather accompanying them. The two accounts are diametrically opposed to one another, and from the opportunities possessed by the observers, as well as their character, both are entitled to be considered as correct. At present, therefore, I cannot offer further information upon this head, than that the prevailing wind is from the north-west to the south-west, and very seldom easterly; that northerly winds bring gloomy wet weather; and that hard gales may be expected from the south-east to the south-west, but that they are generally over within 24 hours. Both accounts agree in stating that there is more wind in summer than in winter.

The following important meteorological summary, which has been kindly furnished us by Mr. T. Havers, the late secretary of the Falkland Islands' Company, will be of the greatest service to the visitor. It will be seen that westerly winds here have almost the constancy of the trade winds of the tropical zones, and the observations entirely accord with the previously given conclusions.

Temperature and prevailing winds at the Falklands, from observations made at Port Stanley, from the 21st of July, 1851, to the 31st of July, 1852. The thermometer was hung in the shade, on a wall, having an eastern aspect, and the temperature noted was the average of three observations each day:—

The wind was marked for the quarter it had blown most from during each 24 hours. The weather table contains an accurate description of the state of the atmospheric phenomena each day.

Winter season, comprising May, June, July, and August. In May, corresponding to November in England, highest temperature 47°, lowest 30°, mean 41°; wind. S.W., sixteen days; weather mostly fine and sunny, with a few squalls of snow and hail, and one or two night frosts. Nine days N.W., fine clear weather, but blowing hard, sometimes quite a gale, accompanied by rain. Five days N.E., if calm, light mists, otherwise a gale of wind.

In June, corresponding to December, highest temperature 46°, lowest 29°, mean 38°; wind, West to North, fifteen days misty and blowing. with calm and fine weather. Twelve days South to West, clear and frosty, and blowing squalls, with snow. Three days North to East, dull, blowing hard, with thick rain.

In July, corresponding to January, temperature, highest, 38°, lowest 23°, mean 33°. Wind, thirteen days West to North, mostly calm, alternate falls of snow and dull thaws. Eleven days South to West, fine frosty light winds, and falls of snow. Four days North to East, blowing hard, with rain, and thawing fast. Three days East to South, snow squall and dull, with heavy falls of snow.

In August, corresponding to February, highest temperature 42°, lowest 32°, mean 37°. Wind for twenty-two days N.W., weather mostly fine, mild, and sunny, with some rain, and a few gales. Seven days S.W., misty, sleet and snow, but light winds. Some snow remaining on the tops of the hills.

Spring season.—September and October. In September, corresponding to March, highest temperature, 48°, lowest 33°, mean 42°. Wind, sixteen days N.W., mostly fine blowing weather. Twelve days S.W., squally, sleet, snow, sunshine, and rain. In October, corresponding to April, highest temperature 64°, lowest 32°, mean 45°. Wind twenty-one days West to North, mostly fine, sunshiny, blowing weather, with calms and rain. Nine days South to West, very fine, with occasional snow squalls. On the 25th, thunder. Wind, S.S.E., temperature 64°.

Summer season.—November, December, January, February.

In November, corresponding to May, highest temperature 61°, lowest 38°, mean 51°. Wind, fourteen days West to North, seven days North to East, five days South to West, and four days East to South. Weather generally very fine and calm; some dull and close days; a heavy snow storm on the 12th; temperature 38°.

In December, corresponding to June, highest temperature 60°, lowest 38°, mean 50°. Wind, eleven days South to West, ten days West to North, seven days East to South, and two days North to East. Weather changeable; three thunder storms, one very heavy; temperature 58°; mostly dull and heavy, with a good deal of rain, and some gales of wind.

In January, corresponding to July, highest temperature 66°, lowest 40°, mean 56°. Wind, ten days South to West, nine days West to North, seven days East to South, and three days North to East. Weather fine, clear, and fresh; two thunder storms; two snow and hail squalls, and some dull, heavy, rainy days, with a few heavy gales.

In February, corresponding to August, highest temperature 63°, lowest 42°, mean, 55°. Wind, sixteen days S.W. Some very fine weather, but hardly a day without rain, and snow squalls. Nine days, N.W., misty, changeable, and blowing weather.

Autumn season,—March and April. In March, corresponding to September, highest temperature 68°, lowest 41°, mean 55°. Wind, thirteen days South to West, twelve days N.W. Weather, generally fine, some cloudy days, and on most a few hours of squally mist or rain.

In April, corresponding to October, highest temperature 63°, lowest 34°, mean 46°. Wind, sixteen days South to West. Weather fine, showery, calm, and some squalls. Ten days N.W., fine, but blowing gales of wind. Three days S.E., calm and fine, with snow.

		Temperature.			Prevailing Winds.	
		highest.	lowest.	mean.	days.	days.
		°	°	°		
Winter.	May	47	30	41	16 S.W.	9 N.W.
	June	46	29	38	12 S.W.	15 N.W.
	July	38	23	33	11 S.W.	13 N.W.
	Aug.	42	32	37	7 S.W.	22 N.W.
Spring.	Sept.	48	33	42	12 S.W.	16 N.W.
	Oct.	64	32	45	9 S.W.	21 N.W.
Summer.	Nov.	61	38	51	variable.	14 N.W.
	Dec.	60	38	50	11 S.W.	10 N.W.
	Jan.	66	40	56	10 S.W. 7 S.E.	9 N.W.
	Feb.	63	42	55	16 S.W.	9 N.W.
Autumn.	March	68	41	55	13 S.W.	12 N.W.
	April	63	44	46	16 S.W.	10 N.W.

The N.W. wind brings the highest temperature, and is the prevailing wind during six months of the year.

Sea Weed, or KELP, as an indication of shoal water, is invaluable in these parts, and is therefore strictly to be noticed by the navigator. Captain FitzRoy says—"In approaching the land, and especially while entering a harbour, a careful lookout should be kept for 'fixed kelp;' the seaweed growing on every rock on those places, which is covered by the sea, and not far beneath its surface. Lying upon the water, the upper leaves and stalks show, almost as well as a buoy, where there is a possibility of hidden danger.* Long stems, with leaves, lying regularly along the surface of the sea, are generally attached to rocky places, or else to large stones. Occasionally a few straggling stalks of kelp are seen in deep water, even in 30 fathoms; many of which are attached to stones, and so firmly, that their long stems will sometimes weigh the stone adhering to the roots. Such scattered plants as these need not be minded by a ship; but in passing to windward of patches or beds of kelp, or rather in passing on that side from which the stems stream away with the current, care should be taken to give the place a wide berth; because the only part which shows, when the tide is strong, lies on one side of, not over, the rocks. Where the stream of tide is very strong, this kelp is quite 'run under,' or kept down out of sight, and can no longer be depended on as a warning. When a clear spot is seen in the middle of a thick patch of fixed kelp, one may expect to find the least water.

"Drift kelp, or that which is floating on the surface of the sea, unattached to any rock of stone, of course need not be avoided; it may be known at a glance by the irregular, huddled look which it has."

Mr. Darwin, in the third volume of the same work, remarks, "There is one marine production which, from its importance, is worthy of a particular history. It is the kelp, or *Fucus giganteus* of Solander. This weed grows on every rock, from low water mark to a great depth, both on the outer coast and within the channels. I believe, during the voyages of the *Adventure* and *Beagle*, not one rock near the surface was discovered, which was not buoyed by this floating weed. The good service it thus affords to vessels navigating near this stormy land is evident; and it certainly has saved many a one from being wrecked. I know few things more surprising than to see this plant growing and flourishing amidst those great breakers of the Western Ocean, which no mass of rock, let it be ever so hard, can long resist. The stem is round, slimy, and smooth, and seldom has a diameter of so much as an inch. A few taken together are sufficiently strong to support the weight of the large loose stones to which in the inland channels they grow attached; and some of these stones are so heavy, that when drawn to the surface, they can scarcely be lifted into a boat by one person."

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* The dangerous nature of kelp may be understood by the following remarks of Capt. King in his Directions for the Straits of Magalhaen.

"With daylight and clear weather a vessel may close the shore without risk; because the water is invariably deep, and no rock is found which is not so marked by seaweed (or *kelp*, as it is generally called), that, by a good lookout at the mast-head, its situation is as clearly seen as if it were buoyed. By avoiding kelp, you are sure of having sufficient water for the largest ships on any part of this coast. At the same time it must be remembered that kelp grows in some places from a depth of 30 fathoms, and that, on many parts of this coast, you may pass through thick beds of seaweed without having less than 6 fathoms of water. Still it is always a sign of danger, and until the spot where it grows has been carefully sounded, it is not safe to pass over it in a ship. As an instance:—after sounding a large bed of this weed in one of the *Beagle's* boats, and thinking it might be passed in safety, a rock was found, not more than 4 feet in diameter, having only 1 fathom over it. Kelp is, therefore, always to be avoided."

Captain Cook, in his second voyage, says, that at Kerguelen Land "some of this weed is of a most enormous length, though the stem is not much thicker than a man's thumb. I have mentioned that upon some of the shoals upon which it grows, we did not strike ground with a line of 24 fathoms. The depth of water must, therefore, have been greater. And as this weed does not grow in a perpendicular direction. but makes a very acute angle with the bottom, and much of it afterwards spreads many fathoms on the surface of the sea, I am warranted to say that some of it grows to the length of 60 fathoms and upwards." Certainly at the Falkland Islands, and about Tierra del Fuego, extensive beds frequently spring up from 10 and 15 fathoms water. I do not suppose any other plant attains so great a length as 360 feet, as stated by Captain Cook. Its geographical range is very considerable. It is found from the extreme southern islets near Cape Horn, as far North, on the eastern coast, as lat. 43°; and on the western it was tolerably abundant, but far from luxuriant, at Chiloe, in lat. 42°. It may possibly extend a little farther northward, but is soon succeeded by a different species. We thus have a range of 15° of latitude; and as Captain Cook, who must have been well acquainted with the species, found it at Kerguelen Land, no less than 140° in longitude.

DESCRIPTION OF THE COASTS.

EAST FALKLAND.

BERKELEY SOUND is situated at the north-eastern extremity of the group. Governor Moody marked out the plan of a town, to be called "ANSON," after the great circumnavigator; but after much deliberation it was determined to have the principal settlement at Port William, lying adjoining to and southward of Berkeley Sound, the objection to which is the difficulty which vessels find in bearing to windward through the Sound up to Port Louis. The greater advantages of Port William, as a port and refuge for large vessels, have led to this determination, although the land is less adapted for colonization; but this is perhaps subordinate to the consideration of the facility of supplying shipping.

Berkeley Sound is the *Puerto de la Soledad* of the Spaniards, and the *Acarron Bay* of the French. It was at the N.W. part of this harbour that the latter, under M. de Bougainville, had their settlement in 1764. It may be taken as limited by Eagle Point or Volunteer Point on the North, and Kidney Island or William Point on the South. It is 4 miles wide at the entrance, and upwards of 5 leagues in length, terminating in the three excellent anchorages of Johnson Harbour, Stag Road, and Port Louis. Berkeley Sound was considered to be the only place on the East coast that could be entered at night, if the entrance had been made out before. It might even be worked into safely, nearly as far as Johnson Harbour. However, the lighthouse and beacon at Port William, presently alluded to, will facilitate the entrance to that now the principal port.

The settlement of Port Louis is securely situated along the edges of a small bay, which has a narrow entrance into it out of the Sound. The buildings constructed by the Spaniards were remarkable for their thick walls of stone. They are very straggling, covering a space of half a mile in length, and a quarter of a mile in breadth. Among them are the remains of one used as a church, and another as a hospital. These are now occupied by the Falkland Islands company's officer, from whom information and assistance can be obtained.

Off the N.E. point of the Sound is a ledge, above water, called the *Volunteer Rocks;* and N.E. by E., about three-quarters of a mile from the point is the sunken rock upon which the *Uranie*, French frigate, so unfortunately struck in February, 1820. This rock is the more dangerous, as with westerly winds the sea seldom breaks on it, and it is the only rock of the whole group on which kelp does not grow. It is nearly 9½ miles N. 13° W., or N. by W. ⅛ W. from the lighthouse on Cape Pembroke. The best marks to clear it, particularly in the night, are to keep Cape Carysfort to the eastward of W.N.W. until Mount Low bears S.S.W. ½ W.; a vessel will then pass nearly 2 miles outside of it, and may then haul up for Mount Low, which is the most eastern high hill on the island, and may be easily seen, on a clear night, when to the northward of Volunteer Point; the summit, which is 840 feet high, forms two peaks, and from the eastern one the land slopes down to the point which separates Berkeley Sound from Port William.

When these rocks are cleared, and the Sound is fairly entered, there is no danger except from a small ledge of rocks off Eagle Point, about 2 cables' length from the shore, with kelp growing all over it, and therefore easily seen. Above this point the Sound is quite clear till well up, when a ledge of five or six black rocks will be seen on the North side, behind which is an excellent harbour, called *Johnson's Harbour*, with good holding ground in 6 or 7 fathoms, and greater convenience for watering than in any other part of the bay.

CAPE PEMBROKE is the easternmost extremity of the Falkland Islands, and the southern side of the entrance of Port William, in which is Stanley, the present seat of government.

The Lighthouse is an iron tower 60 feet high, painted in red and white bands, which shows a brilliant fixed light in all directions seaward, at an elevation of 110 feet, and to be seen 14 miles off. It is dark towards Port William between the bearings of N.W. ½ N. and West.

PORT WILLIAM is immediately to the South of Berkeley Sound, the former principal port. The entrance to it cannot be well made out till near the land, but the before-mentioned lighthouse will materially alter this. With a fair wind, and coming from the northward, after rounding Volunteer Point, Mount Low should be kept about a point on the starboard bow; some white sand hills will then be seen ahead and close to Kidney Island: at the same time the Seal Rocks, which form the extreme of the South entrance to Port William, will be seen on the horizon, just open of Cape Pembroke, and about two points on the port bow. By continuing on this course till within a mile of Kidney Island (which can be approached in safety to within a quarter of a mile) the northern point of the entrance to Port William, William Point, will be made out clearly. It is low and rocky, and has tussac growing on it, which has the appearance of low green bushes, and is easily distinguished from the rest of the land. This point may be passed within a cable's length, and the entrance to the harbour will be seen bearing S.W. The port is entered after passing William Point, and there is good anchorage in the bay, between it and Cape Pembroke, in from 11 to 12 fathoms, sheltered from all the prevailing winds. The next point is *Charles Point*, about 2 miles further. It has two small detached rocks at its extremity, off which there is a kelp patch, close to the edge of which is deep water.

Yorke Point, on the South side of the harbour, and the islets to the East of it, are all steep; the entrance is wide enough for a line of battle ship to work in, and the edge of the kelp is a secure guide; but the white sandy bay on the South side should not be entered, as it is shallow. In standing towards it a vessel should tack when in the line of the islets and of Yorke Point. Immediately the point is passed, Sparrow Cove will be seen open on the North side of the harbour, under Mount Low, and the entrance of Stanley Harbour on the South side. Above Port William anchorage, a long creek winds through the hills to the West up to Murrell River; its whole extent being about 3½ miles. The landing on all the beaches is bad, in consequence of the scattered fragments of quartz rock, from 1 to 3 feet long, which will greatly injure a boat if she touches them. The only safe landing is on the rocks, where they are steep-to. There is a very good watering place on the West side of the cove, on the North shore, in a bight outside the entrance to Weir Creek; but care must be taken in landing, on account of the stones. Water and peat abundant. Vessels that remain in Port William will find good anchorage in Sparrow Cove, and an unfailing supply of good water in its N.W. corner. In Port Harriet, South of it, there is a good stream in a cove on the North shore, about a mile inside the entrance.

STANLEY HARBOUR, the seat of the government, is on the South side of Port William. It is now provided with many advantages for the refitment and refreshment of passing vessels. The greatest drawback was the want of running water near the settlement, but this has been obviated by several wells, and a reservoir is also constructed, so that all vessels can now depend on a ready supply. The Falkland Islands Company supplies *good* water at 2s. 6d. per tun. Good and cheap beef may be obtained in any quantity, and wild fowl and fish are also very abundant. Wood cannot be had, but peat, which is a fair and pleasant substitute for it, is plentiful, and when compressed is found to be a valuable fuel.

The company have a diving apparatus, by means of which a ship's bottom can be examined and repaired. They have also the appliances for heaving down, and hulks for receiving cargoes, and they will also undertake repairs.

If the wind is southerly, the passage into Stanley Harbour should not be attempted except by a small quick working vessel: but with the wind to the northward of S.W. it may be passed by the largest ships. It is little more than a cable's length broad, but both points can be passed within 30 yards. If the wind is S.W. so as to make it necessary to pass very close to the western or *Navy Point* to fetch through, a vessel should work up well to windward of the entrance, and entering under all sail and with good way on, directly the sails lift from the wind, drawing out in passing the point, she should be kept a little higher, so as to shoot through with the sails shaking till she gets the steady wind inside the point. When inside the Narrows, the harbour may be traversed by any vessel under the size of a line of battle ship. There are 3½ fathoms a cable's length from the kelp on each side, and above 4 fathoms in mid-channel, close up to the town, which is about 2 miles to the westward of the entrance, on the South shore. The largest ships have plenty of room to round to and anchor in mid-channel, in about 15 fathoms, as far up as they choose to fetch. After passing the Narrows the bottom is excellent, a stiff mud, which often causes some trouble in getting the anchor up again.

Ships bound round Cape Horn should not enter Stanley Harbour, as the wind, which would be fair for them to sail, would be foul for getting through the Narrows. They may anchor outside the entrance, about a quarter of a mile N.W. of them. Vessels coming from Cape Horn might always go into Stanley Harbour, as any wind which would be fair for them to sail, if bound to the northward, would also be fair to leave the harbour. Large ships, when abreast of the entrance in coming up Port William, not intending to enter, should stand towards the Narrows till they shut in the entrance point of Port William, when they will have from 6 to 7 fathoms, about a third of a mile from the shore, and can easily leave with any wind.

The previous description of, and directions for, Stanley, are chiefly derived from those issued by the Hydrographic Office. The following is by Mr. Phillips, pilot, of Stanley:—

Ships from the southward should sight Cape Pembroke, which is the easternmost point of the Falkland Islands, and on which there is a lighthouse with fixed light. With a commanding breeze anything South of West, keep to seaward of the Wolf Rock, and pass between the Seal Rocks and Cape Pembroke, and then between the Billy Rock and Seal Rocks, where there is plenty of water, and no danger that may not be seen. Having passed the Billy Rock, haul up, and if in doubt, or if the pilot has not come off, anchor abreast of the William Islets; but in daylight there is no danger in standing in to the entrance of Stanley Harbour. The above directions are for westerly winds, which generally prevail; but when the wind is easterly, keep outside of the Seal Rocks.

Coming from the northward, with westerly winds, make Cape Carysfort, or with easterly winds, Volunteer Point. When they are passed, steer for Cape Pembroke, on which the beacon or lighthouse will be seen, until Port William opens to starboard, when run in and anchor, or wait for a pilot, according to the above directions.

In case of darkness or fog, ships may anchor in the mouth of Berkeley Sound or of Port William, or stand off and on, as may be expedient, there being no danger that is not buoyed by the kelp.

The Wolf Rock bears from Cape Pembroke S. ½ W. by compass, distant nearly 3 miles. It is of a triangular shape, each side being about 3 cables' lengths.

The Seal Rocks lie about three-quarters of a mile from Cape Pembroke, and are clean on all sides. The tide runs North and South about 3 knots between Cape Pembroke and the Seal Rocks; the flood setting to the northward, and the ebb to the southward.

It is high water, full and change, at $5^h\ 30^m$. Spring tides rise 4 to 7 feet.

The other parts of the Falkland Islands do not need such particular description as the preceding, as they, without exception, have no importance, except as places of stopping, or as anchorages, It may be remarked that, with the exception of the above, none of the ports on the S.E. side should be attempted except in good daylight, when the kelp, the only invariable guide, can be seen. In general, by avoiding this, you avoid danger, but not always so; where the kelp does not grow, the shallow sand may be plainly seen from aloft.

Port Harriet is 5½ miles to the S.W. of Cape Pembroke; it is swampy and of no importance, but affords excellent anchorage a quarter of a mile N.N.W. of the south-eastern point. *Port FitzRoy* is 8 miles beyond this, and there is no danger between it and *Beach Point*, half the distance beyond which there are numerous kelp patches. The best entrance from the East is to the northward of all these, keeping close to the kelp on the main shore. *Fitz Basin*, large and shallow, like the *North Basin*, enters through a remarkable gorge on the North shore. *Port Pleasant* is immediately South of it. It has two entrances formed by a narrow island, the northern of which is the best, carrying 2½ fathoms. The shores hereabout are the favourite resorts of numerous herds of cattle. It is difficult to make out the entrances of Ports Pleasant and Fitz Roy from the sea.

Choiseul Sound enters between *Fox Point*, the southern extremity of a long white sandy beach, with a small dark islet off it, and 9 miles from Pleasant Road, and *Lively Island* on the South. It extends 26 miles from East to West, is 5 miles broad at its entrance, gradually becoming narrower towards its head, and terminating in a long narrow inlet called Bodie Creek, which runs 4 miles westward of the head of the Sound. The head of Brenton Sound, which runs southward out of Falkland Sound, reaches within about a mile of its upper portion, forming a narrow isthmus connecting the southern and northern peninsulas. The whole of Choiseul Sound is studded with islands, which form excellent and well sheltered anchorages for small vessels. Large ships can bring up in any part of the Sound in from 12 to 18 fathoms water. The bottom is all mud, covered with shells and weed. The best entrance to the Sound is to the northward of the *Middle Island* in the entrance, between it and the two black rocks, which are several feet high, and half a mile from the North shore. *Mare Harbour*, one of the finest on the coast, and easily accessible for the largest ships, is on the North side after passing the entrance. The whole country around here is covered with herds of wild cattle. On the South side of the Sound is a large inlet called *Victoria Harbour*, affording good anchorage for large ships. There is but little tide in the Sound.

LAFONIA, as the southern peninsula has been named from the purchaser, Mr. S. Lafone, is, as just stated, limited by Choiseul Sound on the East side, and Brenton Sound on the West. The original projector of this colonization has transferred his rights to the Falkland Islands Company, as stated in the introductory remarks to this section.

Lively Sound, on the West side of Lively Island, has good anchorage for a vessel for the night to the northward of Motley Island. *Seal Cove*, which lies at the head of it, is one of the best spots for a settlement, should one be formed in this part of the Falklands, and it is also the best place for ships to remain any time. *Seal Island* is the best guide to it, and there is plenty of room for a square-rigged vessel round to the North of it. *Low Bay* has its entrance between the *Trist Islands* and the North part of Bleaker or Long Island. It is indented with several bays, and though it has an inviting appearance, is not an advisable anchorage, having many foul patches. The character of East Falkland hereabout and to the southward is low, few places having a greater elevation than 150 feet.

Adventure Sound is 20 miles in length from Bleaker Island to its N.W. extremity, and its greatest breadth between 3 and 4 miles. It contains several good harbours, and various creeks and coves. Those on its S.W. side are to be preferred; the two best being Adventure Harbour and Moffat Bay. *Adventure Harbour* is reached after passing round Bleaker and North Point Islands, by a W.S.W. course, 4 miles to *Little Island*, a small dark looking mound of tussac, from whence a S.S.W. course 4½ miles more leads clear of all dangers to the harbour. This fine harbour is fit for vessels of any class, and abundance of fresh water to be had. The wild cattle were very abundant. *Moffat Bay* is 1¼ mile to the southward of it. *Barrow Head* to the N.W. is 6 miles S.W. by W. ½ W. from *Turn Island* on the N.W. side of the entrance to the Sound. It has good anchorage and natural supplies. *Fox Harbour*, the next northward, is not so good, and *Sulivan Harbour*, near the Head, has good anchorage. The time of high water is 5½ʰ, rise and fall, 5 to 6 feet.

The Bay of Harbours is 7 miles wide between Cow Point and Bull Point. Nearly midway is Middle Shoal, with a rock awash at low water. *Bull Road* in its S.W. part is by far the most convenient anchorage in the southern part of East Falkland. The largest ships can work into it, and are completely sheltered close to the shore on the South side of the bay, off the entrance to Bull Cove. The guide for Bull Road is to make Bull Point, which is low and tussacky, and off which there is a rocky islet surrounded by kelp. Follow the edge of this kelp to the N.W., and it will lead on to the roads. *Fanny Road* is the only other advisable anchorage on the West side; no directions are necessary for it.

EAGLE PASSAGE to the S.W. of the East Falkland is not to be recommended to large vessels. There is a tide race through it of three knots, and there are several reefs in its S.E. part. The south-western limit of the passage is formed by Barren, George, and Speedwell or Eagle Islands.

Barren and George Islands are the southernmost, and between them there is good anchorage for any vessels, called *Owen Road*; but in coming into it from the eastward, care must be taken not to pass nearer to Barren Island than 2 miles, as reefs run off at least that distance in a north-easterly direction.

Speedwell or Eagle Island, to the northward of George Island, is the largest of the group. It is flat, and not more than 70 feet high. Fresh water and game abound on it, and drift wood on its western side. There are two good anchorages for small vessels on its N.E. side. To the N.W. of it are the *Elephant Cays*, low sandy islets surrounded by reefs and kelp, and no passage inside them.

The Sea Lion Islands, which lie to the S.E. of this, afford a good means of distinguishing the entrances to the various harbours on the coast, but a better still is the *Shag Rock*, a high peaked mass off the entrance to Adventure Sound. The low land around all these harbours is so much alike, that a stranger cannot distinguish them, except by the relative bearings of these more easily distinguishable parts. There is a passage to the East of the larger Sea Lion Island, between it and the kelp, surrounded by a ridge eastward of it; but a long reef, which breaks heavily, extends 2 miles to the southward of that island, for which a good look-out must be kept in running for the opening.

The tide sets to the westward during the flood along the whole South shore of East Falkland. It sets 1 to 2 knots, but near Porpoise Point it reaches 3 knots, and with westerly gales forms a strong race. The tide turns with high water by the shore, which is at $6^h\ 10^m$ full and change.

FALKLAND SOUND is a narrow strait which separates the two main islands, and is 45 miles long in a northerly and southerly direction, and varying in breadth from 18 to 2½ miles. In its southern end there are many flat islands clothed with tussac, and some shoals; the dangers are, however, generally visible. It ought not to be navigated at night; and as good anchorages may be obtained in almost every part of it, and good harbours abound, a safe position may always be selected before dark, and its navigation is easy. The tides in both entrances and between the islands are strong, but in the main stream they are moderate. Vessels at either extremity of the Sound, intending to proceed to sea, should the day be at all advanced, would do well to anchor for the night, and start at daylight; as in that case they would have the whole day to get clear of the entrances, and thus save some anxiety and risk, as the wind generally becomes lighter after sunset. The ports in Falkland Sound need but little directions, the shoals are all buoyed by kelp.

The eastern side of the Sound from the South end up to the N.W. islets, the western side of the peninsula of Lafonia, is a low country, with gently undulating hills, seldom exceeding 150 feet in height; the shore indented with excellent harbours. The western side, on the contrary, is high and bold, forming a singular ridge, varying from 300 to 500 feet high, nearly the whole length of the Sound, but reft asunder in three places, forming Port Howard, Shag Harbour, and Hill Gap. These gaps or fissures form excellent guides to the harbours on the opposite or flat side of the Sound.

Ruggles Bay, at the S.E. end, is abreast of the Calista Islands. The passage to it is between Ruggles and Wolf Islands. Excellent anchorage may be had in it in *Danson and Moffat Harbours*. Inside of the *Tyssen Islands*, North of this, are *Findlay*, *Wharton*, *King*, and *Cygnet Harbours*, all excellent and secure, especially the three first. *Newhaven* is a little port well suited to small vessels on the South side of *Grantham Sound*.

Brenton Loch, an inlet with a narrow entrance to the eastward of Newhaven, extends 9 miles from its mouth close up to the head of Choiseul Sound, which thus peninsulates the southern portion of East Falkland. The navigation of Brenton Loch is impeded by several rocks and shoals, but it is admirably sheltered, and is apparently a great resort for seals. *Port Sussex*, to the North of this, is a snug and good harbour; the best anchorage is on the South side. It is an excellent port for careening and refitting.

Port San Carlos, near the North end of the Sound, is one of the finest harbours in the Falklands, being capacious, secure, and clear of all dangers. Wild cattle and geese abound in the neighbourhood; plenty of fuel and water may be had. Off the entrance of this is the northern and narrowest entrance to Falkland Sound. Between Race Point and Cape Dolphin lie *Foul* and *Middle Bays*, which present no inducement to enter. There is a shoal about three-quarters of a mile S.W. of Cape Dolphin.

The Eddystone Rock, which is off Cape Dolphin, is an excellent mark for the northern entrance to the Sound. It is well seen from a vessel's deck at 8 miles off, and when at that distance exactly resembles a ship under all sail.

PORT SALVADOR, on the North side of East Falkland, is difficult to enter on account of its long and narrow channel and the rapidity of the tides, but when inside good and secure anchorage abounds all over the port, and all dangers, except two shoals of 2 fathoms are visible.

In making for the North entrance to Falkland Sound, steer for *Fanning Head*, the high double peak (600 feet) on the eastern side of the entrance; or, if it be obscured, make a S. by E. course from the Eddystone Rock until within a couple of miles of Race Point, when the eastern shore must be kept on board to avoid the *Tide Rock*, *Awash Rock*, and *Sunk Rock*. The two latter are lurking dangers, but as the Tide Rock shows itself and is steep-to, it forms a good guide to avoid the others, by never bringing it to bear to the eastward of South.

White Rock Bay, at the N.W. entrance of the Sound, is an excellent port, and can be left or entered with any wind. *Manybranch Harbour* will only admit fore-and-aft craft, in consequence of its narrow and crooked entrance. *Port Howard* has also a narrow entrance, but the harbour widens out immediately inside the heads, and is very secure. A vessel would shoot well in by keeping close round the South head with the wind to the southward of West. *Shag Harbour* is fit only for small vessels. *Fox Bay* is wild, and exposed with South winds to a heavy sea, but has a good retreat in its northern arm.

Port Edgar is easily known after making Cape Meredith, or the Arch Islands to the southward, and it is the nearest opening westward of Fox Bay. The bluff and very narrow entrance renders it very difficult to enter with the wind northerly, and when it is between South and West it is very baffling and squally. Therefore good way should be kept on the vessel and the western shore well closed, even to the edge of the kelp. By these means a vessel may shoot past the heads, and inside the harbour, which for security is second to none. There is but little tide in its entrance.

Port Albemarle may be entered from either side of the Arch Islands, but the water is inconveniently deep in the Roads. There is good anchorage in Lucas Bay, but the anchorage among the Arch Islands is preferred by the whalers to that of Port Albemarle, from being nearer to the open sea, and with less depth of water. The *Albemarle Rock*, which is a good guide to the port, is bold, upright, and about 150 feet high, saddle shaped, and whitened by birds. The Arch Islands are remarkably rugged, with upright light coloured cliffs, and have a natural archway, through which a boat can pass at the West end of the largest island.

Port Stephens is the first port to the westward of Cape Meredith, the southernmost point of the islands. The land is very remarkable. Bird Island and the Castle Rock lie to the westward of the port, and a notable hill, called the Three Crowns, with three distinct masses of bare rock, lies to the south-eastward. Stephens Bluff is a remarkably cliffy head, appearing like an island, and its outer part is very similar to the Castle Rock. The entrance is 400 yards wide, and all its dangers buoyed by kelp. Port Stephens is not easily quitted except with a fair wind, particularly after a southerly breeze. There is good anchorage between Stephens Bluff and Pea Point.

Rodney Cove is the only place of shelter between this and Cape Orford, and is a good and secure anchorage, but can only be entered with a leading wind. Cape Orford, which forms the South entrance point to *Smylie Channel*, is cliffy, about 100 feet high, and with a small island called the *Sea Dog*, in the offing. There is a heavy tide runs in Smylie Channel with westerly winds. When inside this entrance, two openings will be seen on either side of *Dyke Island*; the northern one leading into

Queen Charlotte Bay, the other into *South Harbour*, in every part of which there is good anchorage for the largest ships.

There are numerous anchorages in the channels between *Beaver* and *Weddell Islands*. But as all of these channels are too intricate to be generally used, little need be said of them. The best anchorage is in Beaver Harbour, on the East side of Beaver Island. This channel and the kelp will be the best guide to it.

New Island, &c.—From the South entrance of West Point Harbour New Island lies S. 23° W. 22 miles distant, and upon the eastern side of this island is *Coffin*, or *Ship Harbour*. New Island is mountainous, and its western side presents a range of frightful precipices, one of which is 550 feet above the sea, which in westerly storms beats against its base with extraordinary violence. The eastern side, on the contrary, falls sloping into points forming bays, and of these Coffin Harbour is the third from the South.

On coming from the westward, in lat. 51° 42', New Island may be readily distinguished by its being the most northerly large island of that cluster, and by two islets lying off its North end, called Saddle Isle and North Head. Between these and the North end of New Island is a clear passage, but in which during strong winds the tide ripples violently.

Coffin Harbour, being the preferable anchorage, is the most to be recommended. In proceeding to it with a strong westerly wind, on rounding the North end of New Island, the sail on the ship should be particularly attended to, as the gusts of wind off the high land blow with great violence. With the wind at S.W. the South passage may be chosen; but it is to be noticed that a cluster, called the Seal Rocks, lie off the South end of the island, between which and the rocks is the best passage; and by keeping without the edge, off the kelp, which extends to a short distance from the end of the island, there is no danger.

The small round isles on the eastern side of New Island have good channels within, and between them Ship Harbour may be easily recognised by its having a small isle, Ship Island, in it. Behind this is the best anchorage, in 7 fathoms, in a bottom of stiff clay, with the South point of Ship Island bearing S.E., covering the S.E. point of the bay. The anchorage is perfectly land-locked.

Good water may be obtained at a sandy beach abreast of the anchorage, but it should be taken at 8 or 10 yards higher than the present pool on the bank, otherwise it may be brackish and undrinkable. Excellent peat is abundant, especially on Ship Isle. In order to get it dry, it is necessary to pull it from the sides of the pit, not very deep; and as there are several peat holes, by working them alternately, the material may be procured in a state fit for use.

Grey Channel, to the southward of New Island, is clear of all danger on either side of the Seal Rocks, but the tides are strong, especially with westerly winds. If it should happen that a vessel cannot fetch New Island harbour, she should not hesitate to bear up and run along the group of islands off the N.W. side of Weddell Island; she will soon make out *Bald Island*, on the N.W. side of Weddell Island, at the entrance of Chatham Harbour. It is small, round-topped, with a high cliff on its western side, and is close off *Beacon Point*, on which is a hill 300 feet high, with a small stone beacon on it. Passing outside of Bald Island, anchorage may be reached in Bald Road, or in Chatham Harbour, in which Elephant Cove is the best place.

Port Richards, at the S.E. part of Queen Charlotte Bay, offers no very good anchorage, except in a cove on the North shore. Its head nearly joins the inner basin of Port Edgar. Vessels requiring anchorage here will find better in *Antony Creek*, or Carew harbour, to the West of Port Richards. *Philomel Road* is on the northern side of Queen Charlotte Bay. On its northern side is Shallow Harbour, which may be known in coming from the westward by the steep bluff 2 miles West of it. A bright green tussac island lies abreast of the harbour, which may be passed close on its South side. The chart and kelp will be the best guides. At the N.E. end of the road a narrow channel, 6 miles long, leads to the splendid land-locked harbour of

Port Philomel: but the tide is so strong in this channel that it is hardly safe but for small quick-working vessels to venture up it.

KING GEORGE'S BAY and Queen Charlotte Bay are separated by a long narrow strip of land, off the extreme of which lie the four *Passage Islands.* The two eastern passages are very good, and clear of all danger. All the shores of the Passage Islands are steep, and there is no outlying danger but what shows plainly; but there is no good anchorage near them. King George's Bay narrows *Christmas Harbour*, which one day is likely to be of much importance, as it leads to the heart of West Falkland. At its head there are creeks and large fresh water streams, the largest of which is the *Chartres River*, running through some of the best, and best watered land of the whole group. The entrance to it is well marked by *Town Point*, which, after a vessel has passed *Hummock Island*, appears as if covered by scattered houses, an appearance caused by numerous patches of white sand. *Port North*, further West than this, is a deep bight with a moderate depth of water, but rather exposed to West and S.W. gales.

WEST POINT HARBOUR.—The next principal anchorage to Port Egmont is *West Point Harbour*, at the western extremity of the southern land of Byron's Sound. There are two passages into it, one on the North and the other on the South. The *Jason Islands*, lying to the N.W., are much in the way of the former; and these islands must be cautiously avoided in the night and in unsettled weather, as the tide runs so strong and irregular amongst them as to render a ship almost unmanageable.

The southern passage to West Point Harbour is easily made, by being careful, when coming from the westward, to haul close round West Point Island, so as to enter with it on the larboard side, for by neglecting this precaution, with the wind from the westward, you may fall to leeward of the passage, and find it difficult to work out of the lee-bays into which a heavy sea frequently rolls. The latitude of the anchorage here, according to Captain Weddell, is 51° 24′ 15″, and the longitude is about 60° 51′.

The best anchorage in West Point Harbour is abreast of a small cove on the South side, in 5 fathoms, over a bottom of sand and mud. The stream of tide here is scarcely perceptible, although it rises about 9 feet by the shore, and flows, on full and change days, at $7^h 30^m$. Water may be obtained at the head of the cove; and at the head of the harbour there is also a run of water, in which mullets may be caught by constructing a fish weir. Water is abundant during the spring and autumn, not only here, but at Beaver Island, to the S.W., and at Little Port Egmont, in the West side of the passage to the greater port of the same name.

At the West end of West Point Island is a rookery of the small albatross, which in October affords a good supply of eggs. Some brushwood grows around the cove, but it is too small to be useful.

In proceeding through the Gut of West Point from the southward, with ebb tide, which runs to the N.E. with great rapidity, the great harbour, when opened, must be hastily entered, in order to avoid being swept to the northward by the stream.

PORT EGMONT.—The entrance of Port Egmont, on the North side of the Great Island, may be descried at some distance from the sea, and may be entered by steering S.E. by S., which will lead in safely. On advancing, you will pass two rocky islets, which lie about 9 miles N.N.W. from the entrance; by passing within half a mile of the western side of these, the course in will be about S.S.E. ½ E.

Captain Weddell has observed, that the site of the English settlement at this port was certainly ill chosen. The ruins of part of the town still remain, standing on the South side of a mountain not less than 600 feet high. The settlers, it appeared, had extended their gardens to the westward of this mountain, so that during the winter the solar rays must have been almost lost to them during the greater part of the day.

The harbour is spacious, even to a fault; for its great size, during strong winds, renders communication with the shore inconvenient. The best anchorage is immediately off the creek at the foot of the ruins, bearing N.N.W., in 9 fathoms of water, about three-quarters of a mile from shore. A reef extends from the East point of the creek, but may be known by the kelp which grows upon it. The ground is, however, so tough that the anchor will not be raised without great labour.

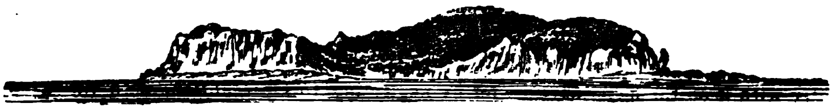
The best *watering place* in this port is at the head of the creek, and the most expeditious method of obtaining water is to fill the casks at low water mark, and raft them off to the vessel. Fuel may be obtained by digging peat, about 100 yards above the top of the creek, but it requires drying, and is not so good as that found at some other places.

The tide, on the full and change, flows at 7ʰ 10ᵐ, and rises about 9 feet.

Tamar Harbour, to the eastward of Port Egmont, is not a good harbour, as the entrance is narrow, rapid tides prevail through it, and there are rocks in the passage.

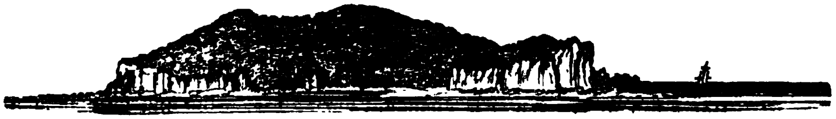
Pebble Sound, lying between Port Egmont and Tamar Harbour, is studded with islands, which would render its navigation difficult to strangers.

BEAUCHENE ISLAND, lying about 7 leagues to the southward of the Eastern Falkland, is uninhabited. We give the appearances annexed from sketches taken by Mr. D. Lye, Master R.N., which have been kindly forwarded by our respected friend, Lieutenant John Evans, of Bedminster.



Beauchene Island, W.N.W. ½ W. 4 miles.

The name of the island is from that of the French navigator Beauchesne Gouin, who discovered it in 1699, and which was soon after given in the charts.



Beauchene Island, bearing North, 4 or 5 miles.

Beauchene Island, N.W. 4 miles.

Capt. Morrell was here in October, 1822, and describes the island as barren, and having deep water around it. On its shore fur seal have been found, and in the moulting season many kinds of oceanic birds.

Captain FitzRoy approached Beauchene Island on the 9th of March, 1834: he says, "Many persons have fancied that there are two islands near together in that place, having been deceived by two hummocks on the only island, which from a distance show just above the horizon like two islets." It is in lat. 52° 51′ S., long 59° 12′ 40″ W.

Capt. George Mintey, when on his passage from Liverpool to Lima, August 15th, 1841, the ship under his command struck on a *sunken rock* to the southward of Beauchene, the compass and binnacle being washed away from the deck. As near as could be judged from the direction of the ship's head by a compass in the cabin, it bore S.S.W., distant about 3½ miles.

16.—BURDWOOD BANK.

This extensive bank of deep water soundings is above 250 miles in length from West to East, and extends on the parallel of Staten Island nearly to longitude 55° W. It has been explored by Sir James Ross in his Antarctic voyage, and its limits and character more fully ascertained by Captain Sulivan and others, as exhibited on the chart.

The original account from which this bank derives its name is of a different nature, as it is an *islet* which was announced, but, it need scarcely be stated, that the existence of this has been disproved by the examinations above alluded to. In our former editions the following notice appeared of this *doubtful* Kains Inlet.

The *Kains* transport, Lieut. T. Burdwood, agent, in her passage from Rio Janeiro to Valparaiso, in November, 1828, is said to have passed a rocky islet in lat. 54° 9′ S., long. 59° 36′ W. The existence of such a rock had been reported by the Spaniards in 1813, but was considered as doubtful. It is stated that Lieut. Burdwood had the satisfaction of having his observations corroborated by a mercantile commander, according to whom it would lie about 120 miles South from the Falkland Isles.

Captain Sir James Ross struck about the eastern extremity of the bank in lat. 54° 41′ S., long. 55° 12′ W., in 280 fathoms, coarse black sand and small volcanic stones. He subsequently made a closer examination, as is stated in the following extract:—

On Nov. 11, 1842, in lat. 54° 18′ S., long. 60° W., he obtained soundings in 50 fathoms, but could not see the rock nor any appearance of broken water, although the weather was clear, and the sea sufficiently rough for breakers to be visible at a considerable distance. The remainder of the day was spent in sounding and surveying the Burdwood Bank, which was traced between 12 and 13 miles to the eastward. The least depth of water was found 24 fathoms, the shoal forming a narrow ridge of volcanic rock, lying nearly East and West, the soundings rapidly increasing in depth on either side of the ridge, and consisting of coarse sand, small stones and shells. The colour of the sea was observed to be of a deep brown over the bank, some dark patches of seaweed (macrocystus) were seen as it was approached, and the line of the bank was marked by a rough ripple on the surface. Ten miles to the northward the depth was 80 fathoms, on fine black sand, and 30 miles further to the North there was no bottom with 300 fathoms.—*Sir James Ross*, Vol. I., pp. 281, 315.

17.—SOUTH GEORGIA.

South Georgia was discovered by Antony La Roche, in 1675, and explored by Capt. Cook, in 1775, who gives the following description:—

" At 9^h a.m. (Jan. 14) we saw an island of ice, as we then thought, but at noon were doubtful whether it was ice or land. At this time it bore E. ¾ S., distant 13 leagues. Out lat. was 53° 56½′, long. 39° 24′ W. Several penguins, small divers, a snow petrel, and a vast number of blue petrels about the ship. We had but little wind all the morning, and at 2^h p.m. it fell calm. It was now no longer doubted that it was land, and not ice, which we had in sight. It was, however, in a manner wholly covered with snow. We were further confirmed in our judgment of its being land by finding soundings at 175 fathoms, a muddy bottom.

" At 4^h in the morning of the 16th we wore and stood to the East, with the wind at S.S.E., a moderate breeze, and fair; at 8^h saw the land, extending from E. by N. to N.E. by N. At noon observed in lat. 54° 25½′, long. 38° 18′. In this situation we had 110 fathoms of water, and the land extending N. ⅛ W. to East, 8 leagues distant. The northern extremity was the same that we first discovered, and it proved to be an island, which obtained the name of Willis's Island, after the person who first saw it.

"At this time we had a great swell from the South, an indication that no land was near us in that direction; nevertheless, the vast quantity of snow on that in sight induced us to think it was extensive, and I chose to begin with exploring the northern coast. With this view we bore up for Willis's Island, all sails set, having a fine gale at S.S.W. As we advanced to the North, we perceived another isle, lying East of Willis's, and between it and the main. Seeing there was a clear passage between the two Isles, we steered for it; and at 5h, being in the middle of it, we found it about 2 miles broad.

"Willis's Isle is a high rock, of no great extent, near to which are some rocky islets. It is situated in lat. 54° S., long. 38° 23′ W. The other isle, which obtained the named of Bird Isle, on account of the vast number that were upon it, is not so high, but of greater extent, and is close to the N.E. point of the main land, which I called Cape North.

"The S.E. coast of this land, as far as we saw, lies in the direction of S. 50° E. and N. 50° W. It seemed to form several bays or inlets; and we observed large masses of snow or ice, in the bottoms of them, especially in one which lies 2 miles to the S.S.E. of Bird Isle.

"After getting through the passage, we found the North coast trended E. by N. for about 9 miles, and then East and East-southerly to Cape Buller, which is 11 miles more. We ranged the coast at 1 league distance, till near 10h, when we brought-to for the night, and on sounding found 50 fathoms, a muddy bottom."

Capt. Cook proceeded to examine the eastern coast, and took formal possession of the land. The tide seemed to rise about 4 or 5 feet. High water at about 11h full and change. The head of Possession Bay, as well as two places on each side, was terminated by perpendicular ice cliffs of considerable height. Pieces were continually breaking off, with a loud explosion, and floating out to sea.

"The inner parts of the country were not less savage and horrible. The only vegetation we met with was a coarse strong bladed grass growing in tufts, wild burnet, and a plant like moss, which sprang from the rocks. Seals were numerous. Several flocks of large penguins were seen. The oceanic birds were albatrosses, common gulls, terns, shags, divers, &c. The land birds were a few small larks. No quadruped was seen.

"Cooper's Isle, at the S.E. end of Georgia, is a rock of considerable height, about 5 miles in circuit, and 1 mile from the main. At this isle the main coast takes a S.W. direction, for the space of 4 or 5 leagues, to the point named Cape Disappointment. Off that are three small isles, the southernmost of which is green, low, and flat, and lies 1 league from the cape.

"The island seems to abound with bays and harbours, the N.E. coast especially, but the vast quantity of ice must render them inaccessible in the greatest part of the year; or at least it must be dangerous lying in them, on account of the breaking up of the ice cliffs. It is remarkable that we did not see a river, or stream of fresh water, on the whole coast. I think it highly probable that there are no perennial springs in the country; and that the interior parts, as being much elevated, never enjoy heat enough to melt the snow in such quantities as to produce a river or stream of water.

CLERKE'S ROCKS are three or four rocky islets, which were subsequently seen at the distance of 2 or 3 miles. Vast numbers of birds, especially shags, were about them.

SOUTH GEORGIA was visited by Capt. Weddell, on his return from the southward, in March, 1823. On the 12th, at 3h p.m., the *Jane and Beaufoy* anchored in *Adventure Bay*, on the S.W. side of the island, in 7 fathoms, bottom of strong clay.

The arrival, though not to a country the most indulgent, was considered to be a very happy event. "Our sailors had suffered much from cold fogs and wet during the two months they had been navigating the South; and, as we had been nearly five months under sail, the appearance of scurvy (that disease so fatally attendant on long voyages) was to be dreaded. Our vessels, too, were so much weather-beaten, that they greatly needed refitting; so that, taking into account our many pressing wants, this island, though inhospitable, was capable of affording us great relief.

"Our crews here fed plenteously on greens, which, although bitter, are very salutary, being an excellent anti-scorbutic; with regard to meat, we were supplied with young albatrosses, that is to say, about a year old; the flesh of these is sweet, but not sufficiently firm to be compared with that of any domestic fowl.

"Our harbour duties, and a search upon the island for animals for our cargo, were immediately commenced, and carried on with zeal, although we experienced frequent interruptions from heavy gales, which were now prevalent; it being near the time of the autumnal equinox of this hemisphere.

"I took opportunities of making various observations on shore, and found the head of the bay to lie in lat. 54° 2′ 48″, and in long., by the mean of two of the best of my chronometers, 38° 8′ 4″. The variation of the compass, at the same place, by azimuth, was 11° 15′ East.

"The head of this bay being surrounded with mountains, I ascended the top of one of them for the purpose of taking the altitude of the sun when at some distance from the meridian; but, after planting my artificial horizon, I was surprised to find that, although there was not a breath of wind, and everything around perfectly still, yet the mercury had so tremulous a motion that I could not get an observation. The ground was evidently agitated internally; though it was only by means of the quicksilver that I could detect it.

"On the 17th of April, our harbour business being completed, both vessels put to sea, and, with the wind at East, we directed our course toward the Falkland Islands.

"I need not remind the reader of the great advantages navigation and geography in general have acquired from the discoveries and investigations of that able navigator Capt. Cook; but the public may not be aware of the great extent to which his researches in the South, in particular, have been beneficial to Great Britain.

"His official report regarding the island South Georgia, in which he gave an account of the great number of sea elephants (called by him sea lions), and fur seals, found on the shores, induced several enterprising merchants to fit out vessels to take them; the elephants for their oil, and the seals for their skins. These animals are now almost extinct; but I have been credibly informed that, since the year in which they were known to be so abundant, not less than 20.000 tuns of the sea elephant oil has been procured for the London market. A quantity of fur seal skins were usually brought along with a cargo of oil; but formerly the furriers in England had not the method of dressing them, on which account they were of so little value as to be almost neglected.

"At the same time, however, the Americans were carrying from South Georgia cargoes of these skins to China, where they frequently obtained a price of from 5 to 6 dollars a-piece. It is generally known that the English did not enjoy the same privilege; by which means the Americans took entirely out of our hands this valuable article of trade.

"The number of skins brought off from South Georgia, by ourselves and foreigners, cannot be estimated at fewer than 1,200,000. I may here also remark, that the Island of Desolation [Kerguelen's Land], which Captain Cook likewise visited and made known, has been a source of scarcely less profit than South Georgia. Hence, it may be presumed that, during the time these two islands have been resorted to, for the purpose of trade, more than 2,000 tons of shipping, and from 200 to 300 seamen, have been employed annually in this traffic."

Captain Weddell now gives his description of South Georgia as follows:—

"The island is about 96 miles long, and its mean breadth about 10 miles. It is so indented with bays, that in several places, where they are on opposite sides, they are so deep as to make the distance from the one side to the other very small. Near the

West end, in particular, there is a neck of this kind, about half a mile broad, over which boats are frequently transported.

"The tops of the mountains are lofty, and perpetually covered with snow; but in the valleys, during the summer season, vegetation is rather abundant. Almost the only natural production of the soil is a strong bladed grass, as above mentioned, the length of which is, in general, about 2 feet: it grows in tufts, on mounds 3 or 4 feet from the ground.

"No land quadrupeds are found here; birds and amphibious animals are the only inhabitants; of the bird tribe, the king penguin is the most worthy of notice."*

18.—THE SANDWICH LANDS.

Mr. Pinkerton says, "These lands may be styled the SOUTHERN THRONE OF WINTER, being a mass of black rocks, covered with ice and snow." They were discovered by Capt. Cook in 1775, on proceeding to the south-eastward from South Georgia. From the lat. of 59° 30′ S., long. 29° 24′ W., the ship stood to the N.E., with a fresh breeze at N.N.W., and passed one of the largest ice islands seen in the voyage, with several smaller. The weather was foggy, with sleet; and, with the wind North by West, she stood to N.E. over a sea strewed with ice.

"At 6^h 30^m next morning, as we were standing N.N.E., with the wind at West, the fog very fortunately clearing away a little, we discovered land ahead, 3 or 4 miles distant. On this we hauled the wind to the North; but finding that we could not weather the land on this tack, we soon after tacked in 175 fathoms of water, 3 miles from the shore, and about half a league from some breakers. The weather then cleared up a little more, and gave us a tolerably good sight of the land. That which we had fallen in with proved to be three rocky islets of considerable height. The outermost terminated in a lofty peak like a sugar loaf, and obtained the name of Freezeland Peak, after the man who first discovered it. Behind this peak, that is, to the East of it, appeared an elevated coast, whose lofty snow clad summits were seen above the clouds. It extended from N. by E. to E.S.E., and I called it Cape Bristol, in honour of the noble family of Hervey. At the same time another elevated coast appeared in sight, bearing S.W. by S., and at noon it extended from S.E. to S.S.W., from 4 to 8 leagues distant; at this time the observed lat. was 59° 13¼′ S., long. 27° 45′ W. I called this land *Southern Thule*, because it is the most southern land that has yet been discovered. It shows a surface of vast height, and is everywhere covered with snow. Some thought they saw land in the space between Thule and Cape Bristol. It is more than probable that these two lands are connected, and that this space is a deep bay, which I called Forster's Bay.

At 1^h, finding that we could not weather Thule, we tacked and stood to the North; and, at 4^h, Freezeland Peak bore East, distant 3 or 4 leagues. Soon after, it fell little wind, and we were left to the mercy of a great westerly swell, which set right upon the shore. We sounded, but a line of 200 fathoms found no bottom. At 8^h the weather, which had been very hazy, clearing up, we saw Cape Bristol bearing E.S.E. and terminating in a point to the North, beyond which we could see no land. This discovery relieved us from the fear of being carried by the swell on the most horrible coast in the world, and we continued to stand to the North."

In this manner the other points were discovered; but the cliffs alone were all which was to be seen like land.

On the 2nd of February the Candlemas Isles were seen. They appeared to be of no great extent, but of considerable height, and covered with snow. A small rock was seen between them, and perhaps there may be more; for the weather was so hazy that the sight of them was soon lost. At noon, on the 3rd, the ship was in lat.

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* The singular habits of the penguins have been noticed; they are also described by Capt. Weddell, pp. 55, 57; and by Mr. Webster, Vol. I., p. 118.

56° 44′ S., long. 25° 33′ W., and was attempting to stand to the South, but a shift of wind made it necessary to tack, and proceed to the eastward. On this course several ice islands and some loose ice were met with.

In closing his remarks on these lands, Captain Cook adds, "I concluded that what we had seen, which I named Sandwich Land, was either a group of islands, or else a point of the continent. For I firmly believe that there is a tract of land near the pole which is the source of most of the ice that is spread over this vast Southern Ocean. I also think it probable that it extends farthest to the North, opposite the Southern Atlantic and Indian Oceans, because ice was always found by us farther to the North in these oceans than anywhere else, whice I judge could not be if there were not land to the South; I mean a land of considerable extent."

ROUTES OF CAPTAIN JOHN BISCOE, TO THE EASTWARD AND SOUTH-EASTWARD OF THE SANDWICH LANDS.

Captain Biscoe has satisfactorily proved the Sandwich Land of Captain Cook to be a group of islands, as will be shown by the following extracts from his journal. This gentleman commanded the brig *Tula*, belonging to Messrs. Enderby, and left the port of London, on a South Sea sealing voyage, July 14th, 1830, but with special instructions from her owners to endeavour to make discoveries in a high southern latitude. The brig was liberally equipped, and accompanied by the cutter *Lively*, as a tender.

After touching at the Cape Verde Islands for salt, the two vessels arrived off the Falkland Islands on the 8th of November, and anchored in Port Louis, Berkeley Sound, on the 10th. Captain Biscoe speaks highly of the convenience of this port for vessels bound round Cape Horn; as fish, bullocks, and fresh water, &c., can be so easily procured. On the 27th they again proceeded to sea, and on their way kept a vigilant look-out for the Auroras, as we have before noticed. On the 10th of December many icebergs were seen. On the 20th an island was made, which proved to be the *Montagu Land* of Captain Cook, a terrific rock, covered with ice, snow, and heavy clouds; and subsequently other points of these islands were seen, as shown on the chart. These are placed by Captain Biscoe about 50′ to the West of the longitudes given by Captain Cook. The thermometer here stood at 29° in the air, and 31° in the water.

Several following days were spent in endeavouring to get to the southward, and, if possible, also to the westward, there being strong indications of land in that quarter; but these were all unsuccessful. The field ice was either quite continuous and unbroken, or where bays were formed in it, and entered, these were found open but a little way, and the vessels were obliged to return as they went in. Fortunately the water was remarkably smooth, even when the wind, which hung to the westward, blew strong; and this circumstance both facilitated the manœuvring of the vessels, and encouraged their crews to persevere, by confirming their surmises as to the existence of land in the neighbourhood. On the 29th of December, at noon, the lat. observed was 59° 11′, long. 24° 22′ W.; but as the wind was then blowing hard from the S.W., farther investigation in that quarter was abandoned. The islands, before seen, were again sighted, and the longitudes of their centres being further determined, and confirmed to be about 27° W., sail was made to the eastward.

On the 5th of January, 1831, the *Tula* and her companion were in lat. 59° 9′, long. 21° 52′, closely skirting the field ice the whole way, and examinining every inlet, in hopes of finding a passage through it to the southward, and, as they hoped, to clear water. In this, however, they were constantly disappointed; and, on the contrary, on the evening of the 7th, says Captain Biscoe, "my hopes in this direction were destroyed, for I suddenly found myself at the head of a bay of firm ice, with a view, from the mast-head, to an extent of at least 20 miles in every direction; and, to the southward, the ice appeared so smooth and firm, that any one might have walked on it. The weather, too, was now so clear, that, I am convinced, land of any considerable elevation might have been seen at 80 or 90 miles. What further astonished me was, that there were no living animals of any kind about this ice, with the exception of one or two small petrels, not even any penguins, which at other times had been very numerous. These circumstances almost convinced me that the ice must have been formed at sea; the temperature of the water being then 30°, and that of the air 31°, with frequent and very heavy falls of snow. Nevertheless there were strong indications of land in the S.W., though none was actually within our horizon, and the water continued very smooth."

19.—THE SHAG ROCKS.

The Shag Rocks are represented as existing in lat. 53° 48′, long. 43° 25′, and are said to be even with the water; but Captain Weddell says, "this I believe not to be the case, as I have been credibly informed that they appear in three pinnacles, or in the shape of sugar-loaves, 60 or 70 feet high, with a reef running around them. These reefs, I presume, may have given rise to the supposed existence of the Aurora Islands."

They were said to have been seen in the ship *Ellerslie*, at 9 a.m., April 2nd, 1855. The captain says they then bore W. by S. ¾ S., distant 5 miles, and showed three separate peaks, about the height of a ship's mast above the water. He adds, they could not be mistaken for icebergs (many of which were in view at the time), on account of their dark colour, and several very lofty icebergs were travelling past them, indicating a great depth of water around the rocks.

But it may be that these islands were merely icebergs, incorporated with earth similar to one seen by Captain Weddell far to the southward.

20.—POTTINGER'S BANK.

On the 5th of January, 1822, Captain Pottinger, of the brig *Tartar*, of London, on his passage from South Georgia to South Shetland, passed over a bank in lat. 54° 36′ S., long. 57° 49′ W.; soundings, 65 fathoms, coral rocks, with sea eggs and shells. He supposed that he had passed over a considerable and much shoaler part of it before daylight, judging by the agitated state of the sea.

Captain Fildes, to whom we owe this communication, says, I saw some of the soundings that came up with the pitch-pot when trying the current, which was the way the bank was discovered; for, on letting down the pot, to their surprise they struck soundings.

21.—SOUTH SHETLAND.

Capt. Cook's concluding remark, given in the preceding page, has been verified, in some measure, by the discovery of the archipelago, now called South Shetland. For the first notices of this discovery the world is indebted to Mr. William Smith, commander of the brig *Williams*, of Blythe, by whom the land was first seen in the month of February, 1819. The *Williams* was, at this time, on a voyage from Buenos Ayres to Valparaiso, and stretching far to the South. On the 19th land or ice was seen in lat. 62° 40′, and near long. 62° W., then bearing S.E. by S., about 2 leagues. Hard gales, with flying showers of snow, and fields of ice, a combination of adverse circumstances, prevented at this time an exploration of the coast; and on the brig's return to the River Plata, in the month of May, similar circumstances prevented any further discovery; but on a subsequent voyage from Monte Video to Valparaiso, in October of the same year, the *Williams* again made the land. Captain Smith, in his journal, says, "I, to my great satisfaction, discovered land on the 15th of October, at 6 p.m., in lat. 62° 30′, long. 60° W., by chronometer, bearing distance about 3 leagues; hazy weather; bore up and sailed toward it; at 4 miles distant sounded in 40 fathoms, fine black sand; an island bearing E. by S. At S.E. by E. bearing, sounded in 60 fathoms, same bottom; hauled off during the night to the northward; at daylight stood in for the land again, at 3 leagues distance. From the body of the islands sounded again, 95 fathoms, fine sand and ooze; at 8ʰ, weather clear and pleasant, saw the main land bearing S.S.E., distance from the islands about 3 leagues. Having run as far as the cape, we found the land trend off to the N.E. Coasting to the eastward, and sounding, found it similar to the former, fine sand. A point bearing E. ½ S., hauled in for it; got the island to bear N.W., distance half a league. Soundings regular from 20 to 35 fathoms, good bottom, sand and gravel. Finding the weather favourable, we down boat, and succeeded in landing; found it barren, and covered with snow. Seals in abundance.

"The boat having returned, which, when secured, made sail offshore for the ensuing night; in the morning altered the course so as to keep the land to the southward in view. Having doubled the point above mentioned, the land then took a south-easterly direction, varying to the eastward; weather thick and squally, with snow. I thought proper, having property on board, and perhaps deviating from the assurance, to haul off to the westward on my intended voyage. Strong variable winds. Made another cape, and could perceive some high land to the westward of it, and stretching in a S.W. direction. The weather becoming thick and squally, we made sail to the westward, having sailed 150 miles to the W.S.W. The weather moderating, saw another headland bearing by observation E.N.E.. distance 10 leagues; very high. Observed in lat. 62° 53′ S., by chronometer, 63° 40′ W. of Greenwich; named this Smith's Cape. Found the land to extend from the cape in a southerly direction. Shaped my course for Valparaiso, where I arrived on the 24th of November, after a passage of sixty days from Monte Video."

Additional information on these lands was subsequently communicated by Captain Walker, of the ship *John*, of London. This vessel, in 1821, arrived from South Shetland in ninety-eight days, with 12,000 seal skins, and afterwards returned for another cargo. The *John* was blown off in a gale of wind, and lost two anchors and a cable; the bottom being very rocky, other vessels have met with similar misfortune.

Captain Cook's description of the Isle Georgia well applies to South Shetland. The country consists of numerous islands, without a vestige of vegetation. A species of moss only is found upon the rocks near the shore; eternal snows covering the more remote parts, which are mountainous. Nature in these regions assumes the most sterile and forbidding features; the thermometer was at no time below the freezing point, but the melting snows near the shore so completely saturated the soil as to check all vegetation. A species of coal was found in abundance, which burnt very well, thus affording the means, if wanted, of replenishing the fuel. The rise and fall of the tide is about 12 feet. Shrimps and penguins beyond all conception numerous. The islands, headlands, &c., have been named, and observations ascertaining the latitude and longitude repeatedly made. Part of an anchor stock, evidently Spanish, being bolted with copper, and bearing certain marks, was found on shore, and is presumed to be the only vestige now remaining of a 74-gun ship of that nation, which sailed from Spain, bound to Lima, in 1819, and has not since been heard of.

Several United States' vessels have visited South Shetland; and an American account states that some of the harbours are very good, vessels in them being landlocked. On the first three months of the year 1821, the mildest experienced there was March; but the seals had mostly retired to the water. A solitary spot or two of something like grass were the only marks of vegetation. No field ice was seen, but innumerable islands were floating about. The flesh of the young seals was often eaten, and was not disagreeable.

Captain Dan. W. Clark, of the ship *Hersilia* (an American), reported that he penetrated to the 66th degree of latitude, where he observed lands stretching farther to the South, the extremities of which he could not ascertain. The whole, even in summer, was blocked up with snow and ice, except in particular places frequented by seals.

An early account of South Shetland stated that sperm whales were seen about the coasts; and it cannot be questioned that such whales may be occasionally here; but we have the authority of Capt. Laurence Frazier for stating that the whales hereabout are mostly fin backs.

About twelve months after the first discovery of South Shetland, the British naval commander-in-chief on the South American station directed a further exploration; and for this purpose a hired brig, the *Slaney*, was sent, under the command of Mr. Edw. Bransfield. "We sailed," says the reporter, "from Valparaiso on the 20th of December, 1819, but did not arrive on cruising ground till the 16th of January, 1820, having been almost constantly harassed with baffling winds and calms till we arrived in a high southern latitude. On that day, however, we had the good fortune to discover the land to the south-eastward, extending on both bows as far as the eye could reach. At a distance, its limits could scarcely be distinguished from the light white clouds which floated on the tops of the mountains. Upon a nearer approach, however, every object became distinct. The whole line of coast appeared high, bold, and rugged; rising abruptly from the sea, in perpendicular snowy cliffs, except here and there where the naked face of a barren black rock showed itself amongst them. In the interior, the land, or rather the snow, sloped gradually and gently upward into high hills, which appeared to be situated some miles from the sea. No attempt was made to land here, as the weather became rather threatening, and a dense fog came on, which soon shut everything from our view at more than 100 yards distance. A boat had been sent away, in the meantime, to try for anchorage; but they found the coast completely surrounded by dangerous sunken rocks, and the bottom so foul, and the water so deep, that it was not thought prudent to go nearer the shore in the brig, especially as it was exposed to almost every wind. The boat brought off some seals and penguins, which had been shot among the rocks; but they reported them to be the only animated objects they had discovered. The latitude of this part of the coast was found to be 62° 26′ S., and its longitude to be 60° 54′ W.

"Three days after this we discovered and anchored in an extensive bay, about 2° further to the eastward, where we were enabled to land, and examine the country. Words can scarcely be found to describe its barrenness and sterility. Only one small spot of land was discovered on which a landing could be effected upon the main; every other part of the bay being bounded by the same inaccessible cliffs which we had met with before. We landed on a single beach, on which there was a heavy surf beating, and from which a small spring of fresh water ran into the sea. Nothing was to be seen but the rugged surface of barren rocks, upon which myriads of sea fowls had laid their eggs, and which they were then hatching. These birds were so little accustomed to the sight of any other animal, that, so far from being intimidated by our approach, they even disputed our landing, and we were obliged forcibly to open a passage for ourselves through them. They consisted, principally, of four species of the penguin, with albatrosses, gulls, pintadoes, shags, sea swallows, and a bird about the size and shape of a common pigeon, and of a milk white plumage, the only species we met with that was not web-footed. We also fell in with a number of the animals described in Anson's voyage as the sea lion, and said by him to be so plentiful at Juan Fernandez, many of which we killed. Seals were also pretty numerous; but, though we walked some distance into the country, we could observe no trace either of inhabitants or of any terrestrial animal. It would be impossible for any but beasts of prey to subsist here, as we met with no so sort of vegetation, except here and there small patches of stunted grass growing upon the surface of the thick coat of dung which the sea fowls left in the crevices of the rocks, and a species of moss, which occasionally we met with adhering to the rocks themselves. In short, we traced the land 9° or 10° East and West, and about 3° North and South, and found its general appearance always the same; high, mountainous, barren, and universally covered with snow, except where the rugged summits of a black rock appeared through it, resembling a small island in the midst of the ocean; but from the lateness of the season, and the almost constant fog in which we were enveloped, we could not ascertain whether it formed part of a continent, or was only a group of islands."

A full description of the sea elephants and seals of these regions, with their peculiar habits, is given by Captain Weddell, in the relation of his voyages, pages 134 to 142; in conclusion, he observes, "The quantity of seals taken off these islands, by vessels from different parts, during the years 1821 and 1822, may be computed at 320,000, and the quantity of sea elephant oil at 940 tons. This valuable animal, the fur seal, might, by a law similar to that which restrains fishermen in the size of the mesh of their net, have been spared to render annually 100,000 furs, for many years to come. This would have followed from not killing the mothers till the young were able to take the water; and even then only those which appeared to be old, together with a proportion of the males, thereby diminishing their total number, but in slow progression. This system is practised in the River Plata. The system of extermination was, however, practised at Shetland; for whenever a seal reached the beach, of whatever denomination, he was immediately killed, and his skin taken; and by this mean, at the end of the second year, the animals became nearly extinct; the young, having lost their mothers when only three or four days old, of course all died, which at the lowest caculation exceeded 100,000!"—*Weddell*, pp. 141-2.

PARTICULAR DESCRIPTION.—On the 12th of February, 1832, Capt. Biscoe, in the *Tula*, was advancing from the westward, and in lat. 66° 27′, long. 81° 50′, many birds were seen, albatrosses, penguins, Cape pigeons, &c., with several hump and finned back whales; and no fewer than 250 ice islands were counted from the deck. On the 15th land was seen, bearing E.S.E., but at a great distance. Lat. of the ship 67° 1′, long. 71° 48′. On the following morning the land was ascertained to be an island, and called *Adelaide Island*, in honour of the Queen; and, in the course of the ensuing fortnight, it was further made out to be the westernmost of a chain of islands, extending E.N.E. and W.S.W., and fronting a high continuous land, which Captain Biscoe believes to be of great extent. The range of isles has since been called *Biscoe's Range*.

The main land was named by Captain Biscoe *Graham's Land*, but it is unquestionably the same which was marked in the old charts by the name of *Gherritz Land*, it having been discovered in 1599, by Dirk Gherritz, of the *Good News* yacht, one of the five Rotterdam ships which doubled Cape Horn, and which he reported to lie in 64° South.*

Adelaide Island is described as having a most beautiful appearance, with one high peak shooting up into the clouds, and occasionally appearing both above and below them, and a lower range of mountains extending about 4 miles from North to South, having only a thin covering of snow on their summits, but toward their base buried in a field of snow and ice of the most dazzling brightness, which slopes down to the water, and terminates in a cliff of 10 or 12 feet high, riven and splintered in every direction, to the extent of 200 or 300 yards from its edge. At a distance of 3 miles no bottom could be found with 250 fathoms of line; and around all the islands the water was considerable. One island, in lat. 66° 20′, long. 66° 38′, has many bays, and forms, with the main land behind, a good harbour for shelter, but the bottom is rocky. No living animal was found on any of these isles, and not many birds, although only a few miles to the northward they were very numerous.

On the 21st of February, Captain Biscoe succeeded in landing on the main land; the highest mountain in view he called *Mount William*, after his late Majesty. The place was in a deep bay, in which the water was so still, that could any seals have been found, the vessels could have been easily loaded, as they might have been laid alongside the rocks for the purpose. The depth of water was also considerable, no bottom being found with 20 fathoms of line almost close to the beach; and the sun was so warm that the snow was melted off all the rocks along the water line, which made it more extraordinary that they should be so utterly deserted. The lat. of Mount William appeared, from observation, to be 64° 45′, in long. 63° 51′.

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* It is also the *Clarence Land* of Captain Foster, 1829, who seems not to have been aware that this name had been given to a principal isle of the group to the north-eastward.

Captain Biscoe, after this, repaired to the South Shetland Islands, where he was driven ashore, lost his rudder, and very narrowly escaped shipwreck.

The northern point of what was considered as the main land by Captain Biscoe, was seen by him, at the distance of about 10 leagues, on the 27th of February, 1832; and the appearance of a range of islets, probably eminences on the main, continued in a north-westerly direction to the distance of 10 leagues farther, and not remote from a spot previously visited by the *Chanticleer* in 63° 26′ S., and 64° 6′ W.. January 1829. To this point Captain Foster imparted the name of *Cape Possession*, having here taken formal possession in the name of King George the Fourth. The coast from the cape takes a south-westerly direction, until lost to the eye on the horizon, where it appears to terminate in a mass of islands, of a bleak and dismal aspect, the same which were afterwards seen by Captain Biscoe.

Early in the morning of the 5th of January, 1829, H.M.S. *Chanticleer*, from Staten Island, came in sight of *Smith's Island*, the westernmost isle of South Shetland. Fine weather of several preceding days was now succeeded by snow storms, which added not a little to the inhospitable appearance of the island. The vessel was also surrounded by icebergs; but with daylight, and no night, she was enabled to thread her course among them. The island was covered with snow, excepting on the sides of the precipices and the faces of the rocks, where it could not lie; and these, from their black appearance, presented a striking contrast with the high snow-clad land.*

On the 7th of January, after passing Smith's Island, the *Chanticleer* was coasting, with fine clear weather and a light easterly breeze, the coast called *Trinity Land*, to the southward of South Shetland. It appeared to be of considerable extent, with mountains of 6,000 or 7,000 feet in height, and covered with eternal snow. The day was fine, and numerous whales (fin-backs) were spouting up columns of water, and blowing about in all directions; while flocks of variegated petrels, or pintadoes, were circling around, and sedulously watching these leviathans of the deep for the purpose of obtaining some sort of food or aliment from their slimy exuviæ; and penguins innumerable were popping up their heads here and there, skipping and starting out of the water in the full enjoyment of their gambols. From the deck of the *Chanticleer* 84 large icebergs were in sight.

The first chart of these islands, for the use of navigators, was constructed by the late Mr. George Powell, commander of the ship *Dove*, and published by Mr. Laurie, in 1822. In the composition of it, exclusive of his own observations and sketches, Mr. Powell was materially assisted by several intelligent commanders, both English and American, and he has added to the islands properly *South Shetland*, another group, considerably more to the East, which he discovered on the 6th of December, 1821. The latter lies between the parallels of 60½° and 60° 48′, and between the meridians of 44° and 47°. About it were innumerable icebergs and ice islands. These isles appear in the chart under the name of *Powell's Group*, or *South Orkney*, and to the principal isle Mr. Powell imparted the name of *Coronation Island*; but

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* Captain Weddell, in his notice of South Shetland, states that he was the first person who landed upon Smith's, by him called James's, Island, the highest and most forbidding of all. The summit he estimated to be nearly 2,500 feet above the level of the sea.

This island was seen, as above mentioned, by Captain Foster, in the *Chanticleer*. who named its summit *Mount Beaufort*, in respect to Captain Beaufort, R.N., Hydrographer to the Admiralty, &c. This summit he states to be about 6,600 feet above the level of the sea, and to have been seen at the distance of 85 miles.

Captain Foster adds, that the position of Mount Beaufort being tolerably well ascertained, may afford to those who, having met with adverse winds off Cape Horn, are compelled to pass its meridian to a high southern latitude, the mean of ascertaining their longitude with tolerable precision, either by its bearing when on a known parallel, or by bearings from two stations sufficiently apart for that purpose, and connected by mean of a self-registering log; and thus may be obtained the position of the ship.—*Webster*, Vol. II., p. 276.

Pomona or *Main Land* has since been proposed by Mr. Weddell, as a more appropriate name.

Capt. Weddell has given an imperfect sketch of Powell's Group, under the name of *South Orkneys*. These islands he fell in with on the 12th of January, 1823; and he describes their coasts as, if possible, more terrific in appearance than those of South Shetland; the tops of the islands, for the most part, terminating in craggy towering peaks, which look not unlike the mountain tops of a sunken land. The loftiest of these summits, towering up to a point, in a clear day may be seen at the distance of 15 leagues.

By observations made on the 14th, it appeared that Saddle Isle, one of the easternmost islets of the group, lies in lat. 60° 37′ 50″, long (by mean of three chronometers) 44° 52′ 45″. Mr. Powell placed this isle in 60° 36′ S., and 44° 32′ W., and this, we conjecture, is nearest to the truth.

Capt. Powell's detail and general remarks accompany the chart above mentioned, under the title of "Notes on South Shetland," and to these notes is appended a Meteorological Journal of the Temperatures of the air and water on every day, from the 8th of November, 1821, to the 26th of February, 1822.* To the notice of the climate, given on page 83, we now add the following:—

REMARKS ON THE WINDS, BY CAPT. ROBERT FILDES, OF LIVERPOOL.

Nearly all the misfortunes that have happened in South Shetland have been in gales of wind from the eastward, which frequently prevail here, and blow with tremendous fury, generally accompanied with heavy falls of snow. No less than seven vessels have been lost, and all with easterly gales, excepting the *Clothier*, an American, which struck on a sunken rock.

In the years 1820, 1821, and 1822, four-fifths of the gales were from the eastward; though we had all looked for harbours sheltered from the westward, under the impression that we should have most to fear from that quarter.

In fine weather, the winds from the S.W. and N.E. are about equal, not keeping long in either quarter. Indeed, with very few exceptions, the winds are always along the land, which renders this coast far less dangerous when under sail than it would otherwise be.

The south-westers here, much like the north-westers at home, are attended with a fine clear sky, and generally sweep away all the fog and sleet of the light north-westers. In two seasons I recollect only one gale from the N.W., which was very heavy. I was then in Blythe Bay, and it was perfectly smooth, though the sea outside was in a manner overwhelming.

It would appear, if a parallel may be drawn from these two seasons, that gales of wind on the land are very infrequent. I have noticed that the wind on the land is generally light, with thick, dirty weather; however, the gales of wind after the middle of February begin to increase in strength, and it is then not worth any one's while to stop longer on the coast. Were I bound round Cape Horn, and to meet with adverse winds, I would not keep hugging the wind, and going about with every slant, but check the topsail-yards in, and keep my reach to the southward, when I should be sure to be not long without an easterly wind, with which I could soon get sufficient westing (the degrees of longitude being so short), and such an offing from the western part of Tierra del Fuego, as to make for me a S.W. wind a fair one.

The danger of falling in with ice is almost chimerical, there being no low drift ice on the North side of Shetland; and in two seasons I only saw three ice islands.

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* Among the names of the commanders who materially assisted in the formation of the chart, we particularly notice those of John Walker, Robert Fildes, Ralph Bond, and Charles Robinson. The latter communications of Capt. Fildes are copious and circumstantial, and will appear, should a second edition of the "Notes" be called for.

REMARKS ON THE TIDES OF SOUTH SHETLAND, BY THE SAME.

The tides on the North coast of South Shetland are very irregular, it being sometimes high water for 24 hours together; at others it flows tide and half-tide, and remains for about 3 or 4 hours high water, and then ebbs again; though there is, in general, one flood and one ebb every 24 hours. Gales of wind raise the tide sometimes much above its natural level; which may account, in some measure, for many skeletons of whales, which lie in many places 12 or 14 feet at least above high water mark, and many yards from the sea shore. In *Blythe Bay* (Desolation Island), I have frequently noticed an easterly gale to raise the water considerably above its common height; and the brig *Lady Troubridge*, of Liverpool, that drove on shore on Christmas Day, 1820, was found, in the next season, forced up nearly high and dry. This was on King George's Island.

Near the mouths of the straits the tides run very strong, and in various directions, which renders the navigation in light winds both unpleasant and unsafe. The flood tide on the coast sets to the eastward.

I have been informed that, when the brig *Williams* was on the survey, they found the current running always strong to the eastward; but as they appear to have taken only a line of coast (it being, without doubt, dangerous for one vessel alone to approach too near), they could not be expected to have had so good an opportunity of experiencing how the tides run in with the land, as those who have been continually passing and repassing in-shore.

In a S.W. gale, I have seen the tide run directly to windward, a full league from the coast, at the rate of 2 or 3 knots; and *vice versâ*, to the eastward again, when the brig *Williams*, and the ship *Indian*, were at once blown out of Blythe Bay with a gale of wind from the eastward. The *Indian*, which I was on board of, drove 10 leagues to the westward; and the *Williams*, though lying-to, drove up 7 leagues to the eastward, and dead to windward two-thirds of the way; which evidently showed that the two vessels had received the impulse of two contrary streams.

From all the observations which I have been able to make, I think the flood and ebb, in moderate weather, runs backward and forward in the offing as far as 2 leagues from the outer points of the land, taking the sweep of the bays; but, be it understood, that it sometimes runs much longer both ways, and likewise stronger than it does at others. Its distance from the coast also varies outside these limits. I have found the current run at least a knot, in the same direction as the wind blows.

From these remarks it will appear that it is not easy to give any satisfactory account of the tides, so as to reduce them to anything like a regular theory. One circumstance, however, may be worthy of notice—fragments of the wrecks of the *Cora* and *Clothier* were all invariably drifted to the westward. Cape Shirreff and the North beaches were scattered all over with them, and not one single particle was ever found to the eastward. The *Cora's* were easily identified, being either cedar or mahogany. On the south side of the land, it is pretty generally admitted, that the motion of the water is, on the contrary, toward the *eastward*, and carrying with it vast quantities of ice, in the direction of the coast, toward Sandwich Land.

In his general remarks, Captain Powell says, "All the northern part of the coasts of South Shetland abounds with islets, rocks, and breakers, while the southern coasts are entirely clear of these dangers; but, in the early part of the spring, the southern sides are blocked with ice, which comes from the land to the South of and opposite to it; when you come up as far as the South beaches, you again meet with rocks and breakers."

The best harbour is formed by *Deception Island*, [lat. 62° 56′, long. 60° 32′,] which island, or *shell* of an island, is certainly one of the most singular productions of nature; the land is high, and bold on every side, with a narrow opening, of about a cable's length, on its S.E. side, leading to a very capacious basin. The isle is a volcanic production; its shores on either side are bold; and pumice stone, with other substances, indicate its origin. There are also several hot springs, some of which are of a temperature sufficient to boil an egg. The basin is 5 or 6 miles across. At its mouth you will have 3, 4, and 7 fathoms of water, and increase very rapidly as you enter; from 7 fathoms you increase to 10, then 18, 27, 32, and then, a little within this, you will get no bottom at 60 fathoms. On the N.W. side of the basin there is a very fine cove, capable of containing several vessels, in about 4 or 5 fathoms of water, and a bottom of good clay. From the entrance of the basin up to the cove the course is N.W. by W.

Deception Island was one of the pendulum station of the late Capt. Foster, and a copious description of it is given by Mr. Webster, in his Vol. I., pp. 144—165; and by Capt. Foster, in Vol. II., 277, 280. Its situations, as shown in the Table of Positions, is lat. 62° 56′, long. 60° 32′;* and from the latter the longitudes of the other islands have been inferred.

The following remarks on Deception, &c., have been given from a journal of the expedition.

" Among ice islands in a boisterous sea, attended with fogs, rain, and gales of wind, the little *Chanticleer* had no easy task to get to South Shetland. On the 10th of January, 1829, the Island of Deception was discovered, and a safe anchorage in the *interior* of it was shortly found. This island is justly entitled to its appellation, and is one of the most extraordinary productions of nature. Its formation is entirely volcanic, the principal part being composed of lava, ashes, and ice. The shores rise to an elevation of some hundred feet, particularly on the North side, which is considerably higher than the South; and being circular, of about 7 miles in diameter, it appears from a distance to be one large mass from shore to shore. In searching for a harbour to receive the *Chanticleer*, an opening was discovered, about 200 feet wide, on its S.E. side; and on further examination, it was soon found that a large circular basin, of about 5 miles diameter, occupied nearly the whole *interior* of the island, the external shores forming a perfect barrier or wall, thereby affording the utmost security within. The depth in the centre of this basin was 97 fathoms, rather too much for anchorage, but a small cove on its eastern side gave ample security to the *Chanticleer*.

"The pendulum was employed here, and the necessary observations performed, whilst the officers of the *Chanticleer* surveyed and explored this extraordinary island. Several small coves were found on the borders of the basin; and some stones placed on each other, in a rude clumsy manner, near one of them, were discovered to have been used by the crew of sealers for the purpose of boiling their oil. Nor were these the only traces of the sealing vessels; for, in the exploring expeditions which were constantly going forward, another pile of stones, on a neighbouring eminence, was found, on examination, to contain the corpse of a man. He had evidently been a sailor belonging to one of these vessels, but of what country could not be discovered. There was nothing found near him to indicate how he had died, nor at what date. The stones were carefully replaced, and a notice left on the spot, that his remains might not again be disturbed.

" The external as well as the internal shores of this island, from the friable nature of its materials, present some very remarkable appearances. The eastern side is entirely faced with cliffs of ice, about 300 feet in height, which the constant washing of the sea forms into singularly fantastic shapes. Similar cliffs are also found on the South and S.W. sides, and their base is bounded with a beach of ashes and lava, which extend round the whole island at low water. The examination of the basin was attended with considerable difficulty, arising from the small ashes and dust which were carried into it from the island. Seals, and their companions, penguins and sea-leopards, were the only inhabitants found in this desolate island, which affords not the slightest verdure. Streams of water, at a temperature of 140° and 160° of Fahrenheit, were found issuing in some places from the sides of the hills, and running into the basin, the water of which was scarcely above the freezing point. It is generally supposed that this basin was formerly the crat r of a volcano, and that the sea has found its way into it by washing out the narrow passage by which the *Chanticleer* entered. How long it has been resorted to by sealing vessels is unknown."

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* Messrs. Fildes and Powell make the latitude 63° 3′, while their longitude agrees very nearly with that of Captain Foster.

BRIDGMAN'S ISLAND.—Near the centre of the Shetland group is *Bridgman's Isle*, in lat. 62° 4′, long. 57° 0′, apparently another volcanic production. Captain Weddell, on passing within 200 yards of it, observed smoke issuing through the fissures of the rock, and apparently with much force. The figure of the island is nearly round. It is very small, but 400 feet in height, partaking of the form of a sugar-loaf.

REMARKS ON APPROACHING SOUTH SHETLAND FROM THE NORTHWARD, BY CAPTAIN FILDES.

On advancing from the northward toward *Livingston's* or the *Main Island*, the land will appear in mountains of a vast height, and covered entirely with snow; the base of them terminating in perpendicular ice cliffs. The whole has an awfully grand, though terrific and desolate, appearance; the snowy mountains showing themselves, one over another, far above the clouds, and exciting in the mind a devotional reverence on the wonders of the Almighty: and even if surrounded on all sides with rocks and breakers, the mind is forced into pious contemplation on the grandeur of the scene.

On this side of the group, in lat. 62° 20′, long. 59° 45′, is a small isle, named *Table Island*, which is by far the most remarkable hereabout,[*] and will always be an infallible mark for any one approaching, as it is not possible to mistake it for any other land. All strangers, therefore, should make this their land-fall, particularly in the early part of the season, for then the land is not so easily made out, and having a great quantity of snow upon it, which may, at times, deceive those best acquainted. Its top appears as level as a bowling-green, and its sides resemble a wall. In the upper part of the N.E. end of it, is a chink, or division, which from some situations may be seen.

22.—LOUIS PHILIPPE LAND, JOINVILLE LAND, &c.

To the southward of the South Shetland group, is the land discovered by the late Admiral D'Urville, of the French Marine, and named by him as above. From a letter, addressed by him to the French minister, contained in the *Bulletin de la Société de Géographie de Paris*, 1838, p. 275, we copy the following notice of his exploration:—

"On the 27th of February, 1838, after a long stretch toward the South, through much ice, we came upon these mysterious lands; and, in spite of the complicated obstacles against which we had to contend, both on account of the continued bad weather, and from the fog and ice, in the space of about eight days we succeeded in tracing exactly their outline, for a distance of about 120 miles, between 63° and 64° South lat. The land, which is crowned with immense peaks,[†] is covered by continual snows, of unknown depth. Were it not for the blackish rocks, rendered visible by the melting of the snows which form their limits on the coast, one would often be scarcely able to distinguish them from the numerous fields of ice which surround them. The principal of these places has received the name of Louis Philippe Land, in honour of the king, who first conceived the idea of making these explorations towards the South Pole. Other islands have received the name of various persons who have exhibited an active interest in our expedition, more especially of that illustrious statesman who arranged the plan of our voyage. Lastly, the mountains, capes, and islands will recall the memory of the officers who took part in our dangers."

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[*] See the view on the chart by Captain Powell.

[†] Mount D'Urville is 3,060 feet high.

These distant and desolate regions were also visited and examined by the Antarctic expedition under Sir James Ross in Dec. 27, 1842—Jan. 30, 1843.

During this exploration many additional features, islands, capes, inlets, &c., were discovered and named. The chief of these are the Danger Inlets to the westward of Joinville Land; an extensive gulf, named Erebus and Terror Gulf, the appearance of which led to a supposition that there was a passage through between Joinville and Louis Philippe Land into Bransfield Strait; an inlet called Admiralty Inlet to the southward of Louis Philippe Land, which was found to extend nearly a degree further South than D'Urville exploerd. Many most interesting particulars are given in the account of Sir James Ross's Expedition, Vol. II., chap. 12. Great numbers of black whales of the largest size were seen, and the whole of the land appeared to be volcanic.

POLAR ICES.—The barrier of ice which surrounds the Antarctic Pole appears to be variable in its extent and locality. We have before noticed the great quantity of ice which had drifted northward, towards the Cape of Good Hope, during the year 1840, or at the period that Capt. Sir James Clark Ross and his companions were so successfully pursuing their discoveries on the opposite side of, and in close proximity to the South Pole. It may have been owing to some great disruption of the barrier, that allowed Capts. Ross and Crozier to penetrate so near to the Pole; and a similar occurrence may have taken place, at the time that our enterprising countryman, Capt. Weddell, proceeded to higher southern latitudes than any previous navigator; he having attained to 74° 15′ S., in long. 33¼° W., between the meridians of the Sandwich Land and the South Orkneys: this was in January, 1823. In February, 1838, when Captain Weddell found the sea clear of ice at the commencement of his bearing to the southward, Admiral D'Urville was prevented from proceeding southward by a compact and impenetrable barrier of ice. In the volume above mentioned, page 121, is a further communication from him, relative to this part of the voyage:—

"Having escaped from our prison we continued along very close to the barrier for about 300 miles, without finding any opening. This time it was uniformly West and East, without the slightest appearance of a passage. On the 15th of February, 1838, having come to 30° 40′ W. long., and having traversed all the parts by which Weddell says that he penetrated without having seen a single field of ice, and finding the barrier take a northerly direction towards the Sandwich Lands, I judged that it was time to quit this tedious search. The crews were much fatigued; the nights already long, redoubled the danger of this adventurous navigation, and I could no longer continue it without a sort of blind imprudence.

"Hence we steered to the West; we made successively the South Orkneys; then the eastern part of South Shetland, where we rectified some grave errors; then we picked our way afresh to the southward; thence, between 63° and 64° S. lat., for the space of nearly 180 miles, we explored the lands before mentioned, until then completely unknown; which we did without any accident.

"At last we cleared entirely Bransfield Strait, which no ship of war had ever before traversed; and on the 7th of March, we quitted definitively the southern lands, and with them the ices. For fifty-two days, we had not been a day without being surrounded with them, and we frequently counted from 60 to 80 bergs, and upwards, around us, independent of those which often barriered our route.

"This navigation was very fatiguing for all the members of the expedition; and although this was the first attempt that had been made by the French, I have the firm conviction that no commander of an expedition could have pushed his researches further than I have done, under the same circumstances."

23.—ISLANDS OF ALEXANDER I. AND PETER I.

Islands of Alexander I. and Peter I.—The first in 68° 57′ S. and 73° W., the other in 68° 0′ S., and 91° W., were discovered by the Russian Captain Bellingshausen, in 1821. Two frigates, under this commander, it appears, were employed on a voyage of exploration, and penetrated to the 69th degree of South latitude, but were unable to proceed further. The particulars of their voyage have been published in the Russian language, but no translation of it has been made.

24.—REPORTED ISLANDS AND SHOALS.

As with other regions, so the South Atlantic has been fertile in the announcement of shoals, islands, and dangers, which have neither been properly authenticated by the simple but inexorable argument of the sounding lead, or by a close examination of the rocks or islands so confidently announced.

In very many instances, as will be seen, these reports rest on the most vague surmises; in others there is a stronger appearance of credibility; yet there are some circumstances connected with them which either totally disproves their existence, or casts such a strong doubt, that it is only necessary here to name them.

In this enumeration an alphabetical arrangement is followed. In some few cases there is a bare possibility of an erroneous reckoning having misplaced a shoal or rock, and thus it has eluded the various searches made for them; but this is probably rare.

L'Aigle Shoal.

A shoal bearing this name is said to have been seen on the 1st of October, 1817, by Mr. R. Poole of the ship *L'Aigle*, who places it in lat. 51° 51′, long. 64° 30′. It was described as extending North and South, 200 or 300 yards. This ship was then steering S.E., and about three-quarters of a mile from it off and on. Steering South, about 1¼ mile, had soundings in 87 fathoms.

In the *Liverpool Mercury*, 12th of Nov., 1824, was a notice from an officer of the frigate *United States*, stating that a rock had been discovered between the Falkland Islands and Patagonia, in lat. 51° 51′, long. 64° 42′.

The position of this shoal, said to be between the Falkland Islands and Patagonia, has been so very frequently sailed over, that it cannot exist. It may have been a current rip.

Antonio Viana Bank.

The only notice that we possess of the shoal bearing this name is the following, from the old Sailing Directions for the Coast of Africa. "Between the seventeenth and eighteenth degrees of latitude, 70 or 80 leagues W.S.W. from Cape Negro (according to Pimentel), are the shoal and breakers of *Antonio Casado de Viana.* These are very dangerous to ships coming from Brazil to Benguela and Angola; one of the rocks only appearing above water. The shoal is very steep, and cannot be discerned in the daytime till you are near, on account of the prodigious foaming of the sea, whose roaring, being heard at a great distance, may during the night give you notice of the danger." (Never since seen or reported.)

Ariel Rocks.

These rocks were stated to have been discovered by the schooner *Ariel*, on her passage from Liverpool to Valparaiso, Dec. 22nd, 1827. "Saw something of a reddish appearance above water, about a quarter of a mile distant; hauled into it, immediately took in all the studding sails, and sounded ground, 47 fathoms, fine sand. The object seen was about 6 feet above water, but larger underneath. When close in saw another head about a cable's length to the N.E. of the first, 2 or 3 feet below the surface of the water, also of a reddish appearance. The sea was breaking over both, and making a noise. There was some seaweed about them, and an immense number of sea birds. The correct position I give as lat. 40° 0′ S., long. 57° 37′ W."—*Thomas Dixon, Master.*

From the nearest land these rocks are, therefore, about 200 miles distant; and they would lie in the direct route of vessels bound to the southward from the Rio Plata.

Captain P. P. King sought for these rocks, but without success. He says:—"On June 21st, 1830, we sailed with a fresh breeze from the S.W.; and at 9^h a.m. on the 25th, when about 1 mile southward of the alleged position of the Ariel Rocks, and near their nominal longitude, I hauled to the wind, and ran some distance on their parallel, looking out for broken water. There was a very regular and heavy swell, as much as would be raised by a gale of wind, but caused, apparently, by a current. A heavy swell rose on the quarter, which struck our weather quarter boat. For a moment I thought we had indeed found the rocks; and the huge black back of a dead whale, which just then showed itself very near the vessel, much increased the sensation. I imagined that we were in a meeting of tides and currents, where old trees, dead whales, &c., are often found.

Captain FitzRoy also says, "In the first volume some notice was taken of the supposed Ariel Rocks, and I will avail myself of this opportunity to say, that at various times the *Beagle* passed over and near their asserted position; and that she likewise searched for the reported Aigle shoal or rock, without ever finding the slightest indication of either."

There is an announcement in the Nautical Magazine, 1845, p. 47. It states that Mr. Tinnon, of the brig *Middleton*, of Maryport, on March 7th, 1844, when on his passage from Buenos Ayres to Valparaiso, discovered rocks in lat. 40° 22′ S., long. 55° 13′, per chronometer (five days out), on which broken water was seen for a quarter of a mile North and South. The ship was about a quarter of a mile from them when discovered. Supposed them to be the Ariel Rocks, though there is a considerable difference in the position. This is all that is stated, but no soundings or verification given, a most reprehensible omission.

Ascençao or Portuguese Ascension.

An island formerly stated to be 300 miles westward of Trinidad, long since exploded.

Aurora Isles.

Several small isles, distinguished by this name, found a place in the charts from the reports of the Spanish navigators, and Captain Weddell gave some copious extracts from those reports. They were said to have been first seen in 1762 by the ship *Aurora*, after which they were named; and again, in 1790, by the ship *Princessa*. The corvette *Atrevida*, in 1794, went purposely to *situate* them; and they were then described as three, very nearly in the same meridian; the central one rather low, and the other two so high as to be seen 9 leagues off. *Positions*:—northern isle, 52° 37′ 24″ S., 47° 43¼′ W.; middle isle, 53° 2′ 40″ S.; 47° 55¼′ W.; southern isle, 53° 15′ 22″ S., 47° 57¼′ W. The description annexed was very circumstantial, and there seemed to be no reason for doubting their existence, however questionable the positions might have been.

The islands have been sought for by Captain Weddell, Captain Biscoe, Captain Johnson, and others, but with no success: and of their non-existence there seems no longer to be any doubt.

Blaesdale Reef.

On the 15th of October, 1819, the brig *Richard*, of Ulverston, Captain Blaesdale, is said to have struck on a coral reef, in about 0° 56′ or 0° 57′ North of the Equator, and longitude, by account, beyond 41° W. The following is an abstract of the *Richard's* log. "Friday, 15th of October, 1819, fine moderate weather; ship going three knots; at 6 p.m. grounded; did not remain fast above ten minutes. Water smooth; saw no breakers. In a few minutes after sounded, but got no bottom with

125 fathoms of line. Latitude at noon, by good observation, 0° 57′ N. Run West until 6 p.m. Longitude 41° 22′ W. The vessel drew 11 feet of water; in one hour there were 18 inches of water in the well. When the ship arrived at Para, whither she was bound, three holes were found, each about the size of a man's hat, and nearly through her bottom, and several large pieces of white coral were sticking in different parts."

This account would seem to be circumstantial, but the U.S. ship *Dolphin*, in her important mission, had a good sounding of 2,980 fathoms in its position, besides two others with no bottom at 1,000 and 2,000 fathoms in its vicinity. This decides the question.

Geerken Shoals.

Two spots of very discoloured water (sunken reefs?), which was slightly breaking on these places, about 4 fathoms deep. No observations could be taken at the time, as the weather was thick and rainy. The positions of these spots were lat. 42° 14′ S., long. 54° 38′ W.; and lat. 42° 16′, long. 54° 42′ W.

The fact of no soundings having been taken invalidates this statement, which must be taken for what it is worth.

Grant Breakers.

Said to have been seen by Captain Grant, 1800 or 1801, in about 31° 33′ S., long. 11° 30′ W. They were high and dangerous, and were supposed to be the same seen by Captain Smith, in the ship *Comte de Molke*, in 1760, in 31° 0′ S., long. 21° 45′ W., or 10° to the westward. This is too vague for credence.

Heard Shoal.

Captain Luther Heard, of the ship *Charger*, from Calcutta to Boston, on January 31st, 1859, at 4h 20m p.m., met with discoloured water. The shoal appeared to be of clear sand, stretching N.W. by W. and S.E. by E., about half a mile, and one-third of a mile in width, and as near as could be judged by the appearance of the bottom, there were 10 or 12 feet water on it. It lies in the track of homeward bound ships round the cape, and is therefore dangerous, lat. 34° 56′ S., long. 17° 40′ E. *No soundings taken.*

Isla Grande.

An island was laid down on the old charts, in lat. 45° 30′, long. 46° 40′. The following is the notice of it:—

"In the latitude of 45° S. there is a very large pleasant island, discovered by *Antony La Roche*, a native of England, in his passage from the South Seas, in the year 1675. The Spanish author, who gives the abstract of La Roche's voyage, printed, according to him, in 1678, says, that La Roche leaving the land (discovered by him in 55° S., and which was seen by the *Leon*, in 1756), and sailing one whole day to the N.W., the wind came so violently at South, that he stood North for three days more, till they were arrived in 46° S.; when, thinking themselves then secure, they relate that, directing their course for the Bay of All Saints, in Brasil, they found, in 45° S., a very large pleasant island, with a good port toward the eastern part, in which they found wood, water, and fish; they saw no people, notwithstanding they stayed there six days. The size of this island is not mentioned in the Spanish abstract; but the expression *muy grande*, very large, and the expectation of finding inhabitants, seem to indicate that it is of great extent.

It was frequently sought for by the older voyagers, who, finding indications of land, such as driftwood, discoloured water, &c., believed in its existence. But it has long since been disproved. In our earlier editions the discussion will be found. It is useless now.

Kattendyk's Droogte.

This so called "dry bank" was placed in about 33° S., long. 4° 55′ E., on Dutch authority. Sir James Ross passed over its position, and found no bottom with 120 to 150 fathoms. Farther East no bottom with 580 fathoms.

Lennon's Reef.

Mr. John Lennon, commander of the ship *Hibernia*, said, "On the 9th of April, 1817, on my passage to India, I touched at the Island of Tristan da Cunha; and at 8 a.m. of the above date sailed again. When clear of the island, steered E. by S. with a fair wind, until 11^h 20^m a.m. of the 12th, then in lat. 37° 31′ S., long. 4° 42′ W. Ship going at the rate of seven knots per hour, perceived a sunken rock close on the port bow; bore up immediately, and with great difficulty escaped running on it. The part or end that at one time was close alongside, I could very distinctly perceive. The rock was about 9 feet under water; and, at the distance of about 100 yards, where I suppose the rock was nigher the surface. *There appeared fields of weed growing from the rock.* On taking a good look-out all round, we could perceive two other rocks or shoals at no great distance from each other. Bearings from Tristan da Cunha, by compass, E. by S., distant, by log, 357 miles.

This was probably driftwood, which is frequently encountered on this parallel.

Montezuma Rock.

According to the Cape of Good Hope Shipping List of July 14th, 1843, Captain A. M. Shiverick, of the American whaler *Montezuma*, discovered, on March 23rd, 1843, a rock lying in lat. 29° 32′ S., long. 39° 30′ W. This is all the information given respecting this danger.

Moore Bank.

Captain Moore, of the *Russell Ellice*, from Swansea, at the Falkland Islands, found soundings in 45 fathoms water, on a supposed bank, in lat. 30° 50′ S., long. 35° 50′ W. The attention was directed to it by the change in the colour of the water.

This is 15 leagues S.W. from the soundings, by Captain Denham, said to be of the depth of 7,700 fathoms, before mentioned. It was sought for, without success, by the *Herald*.

Robson Reef.

Barque *Anne*, of Liverpool, Captain W. W. Robson, toward the Isle of France, 1829.—On Monday, the 12th of October, made Tristan da Cunha. On Sunday, the 18th, at 9^h 30^m a.m., saw on the lee bow what Captain Robson at first supposed to be whales, but, when about 50 yards from them, observed they were rocks about 8 feet above the water, the sea breaking heavily on them. They were something of a horse shoe shape. There was a good deal of long tangle growing on them.

The latitude of the reef is 37° 35′ S., and longitude 7° 31′ E.

Captain Liddell, of the ship *Wellington*, December, 1835, questions its existence, and he says, "I confess I was exceedingly surprised when this account first met my eye, as, on reference to my journals, I found I had passed twice nearly over the very spot, in the daytime. But, when it is considered that this 'crescent rock' is situated not only in the direct route of all the outward bound vessels to the eastward, but also in the very cruising parallel of the American whalers, whose number yearly frequenting that part of the ocean exceeds *three hundred*, may we not be permitted to suspect 'that dead whales, shoals of devil fish, and other huge marine monsters,' are still sometimes mistaken for banks and rocks?

Sandré Rock.

A more than doubtful danger to the southward of the Penedo de S. Pedro, said to have been seen December 30th, 1849. The particulars are given on page 178, *ante.*

Saxemburg Island.

An island, named Saxemberg, is said to have been first seen by J. Lindeman, of Monnikendam, 23rd of August, 1670. He represents it as having a remarkable narrow peak, like a column, near the middle of the island; and, from his account, it was laid down in the charts at about 30° 45′ S., and 19½′ W. Captain Galloway, in the American ship *Fanny*, outward bound to China, in 1804, supposed that he saw it *at a great distance*. He states that it was four hours in sight, from the mast-head, without changing its appearance, which exhibited a peaked hill in the centre, and a bluff at one of the extremities, situated in the parallel above mentioned, but *two degrees more to the eastward.*

It was again supposed to have been seen by Captain J. O. Head, in the ship *True Briton*, on a voyage to Calcutta, 9th March, 1816.

The account of an island, said to have been seen by the *Columbus*, Long, master, in 1809, lat. 30° 18′ S., long. 28° 20′, is now given up as unfounded. These are of the most vague character.

Telemaque Rock.

A rock, said to have been seen January 1786, in lat. 38° 11′ S., long. 21° 56′ E., South of the Cape of Good Hope, but this has long been considered to have been an iceberg.

SECTION IV.

THE NORTHERN COAST OF BRASIL, FROM CAPE SAN ROQUE TO MARANHAM AND PARA.

The COAST of BRASIL, as is well known, was cursorily surveyed by the Baron Roussin, who, however, well determined the geographical positions of the points. The banks off the coast, however, were not minutely examined, and in consequence, the extensive banks which lie at from 6 to 8 miles off the N.E. coast of Brasil were very imperfectly represented. This important defect has been remedied in a great degree by the more minute survey made by Lieutenant M. A. Vital de Oliveira, of the Imperial Brasilian navy, in 1857—9, and to which the ensuing directions have been adapted.

CAPE SAN ROQUE is a headland in lat. 5° 28′ 17″ S., and 35° 17′ W., 8 leagues to the S.S.E. of *Port Touro*, or *Calcanhar*, the N.E. point of Brasil. The cape, *so called*, is merely a down of sand, like the coast which precedes it to the South, and follows it to the North. The sand is uniformly white, and over it are several clusters of bushes. It may be known by several small *red cliffs ;* but these show only when the sun is in a favourable direction; there may, however, be seen, a little to the South, several large trees near the coast: and their wholly disappearing may form a guide for proceeding northward.

The cape is not a salient point, though frequently so marked in the charts ; nor does the land to the northward of it exhibit any remarkable change in appearance.

Northward of Cape San Roque the coast gradually falls, or declines in height, to the distance of 8 miles, where it forms the low point *Pititinga.* Here the shore on the North forms a low bay. The point is not more remarkable than Cape San Roque and is to be ascertained, at a distance, by the difference of latitude only. The coast between the two is wholly of sand downs, on which may be discovered bushes of a dark green colour; and there are, here and there, some large trees, in round masses, but not definable as marks on approaching the shore. The extremity of Point Pititinga is given by the Baron as in lat. 5° 21′ 35′ S., long. 45° 19′ 23″.

POINT TOURO, *Toiro,* or *Calcanhar*, the summit of which is in lat. 5° 8′ 20″ S., long. 35° 30′ 33″, is situate at the distance of 5 leagues N.N.W. ½ W. [*N.W. by N.*] from Point Pititinga, or Petetinga, and the coast continues of the same nature with that which has been described, being low and sandy.

From Cape San Roque to Point Touro the shore is bordered by the *Recife*, or that remarkable ridge of coral rock, which characterises the coast in general, as shown in the charts. The more elevated part of this reef, within the present extent, is called *Pedras de Garca*, about 8 miles to the northward of Point Pititinga, and near which there is good anchorage.

The Recife, the belt or coral chain of rock more particularly distinguishes the eastern coast, but it may also be traced on the northern, nearly all the way to Maranham; and M. Roussin says that it seems as if its object were to defend the shore from the impetuosity of the waves, by which it is constantly assailed.

The reef, in several instances, is so exactly straight and even, as to seem the work of art, and rising like a wall from the bottom of the sea. In some places it is always covered; in others it is level with the sea at high water, and particular spots are from 6 to 10 feet above it. Its cuts or openings form the entrances to most of the creeks and harbours, as will be shown hereafter.

BANKS of SAN ROQUE.—The Banks of San Roque are on a great extent of shoal ground which encompasses all the N.E. coast of Brasil. They commence at Cape San Roque in the South, and terminate beyond Point Tubarao. in the N.W., in an extent of 34 leagues.

Their southernmost point lies E.N.E. 4¾ miles from Cape Santo Roque. It is the South extreme of the *Esparrache de Maracajahu*, a bank 9 miles long in a N. by W. direction, and nearly awash throughout its length, on the outer or seaward edge, with 6 and 7 fathoms water close to. It is separated from the next bank northward by the *Barreta da Pititinga*, a channel across the line of reefs toward the village, with 27 feet water in it, and a mile wide. The drying banks succeed this, and are traversed by the *Barreta do Rio do Fogo*, and the *Barreta das Garças*, two narrow shallow channels at 4 and 7½ miles respectively from the Barreta da Pititinga.

At 5¼ miles farther is the *Barreta dos Touros*, in 4½ fathoms, leading toward the Point, with the *Pedra do Caçao*, a dry shoal in the centre, which forms two entrances. The outer banks of San Roque extend N.N.W. for 5½ miles farther, and terminate to the northward in a 2¾ fathom ridge, at 8½ miles N.E. ½ N. from Touro Point, and has 8 and 9 fathoms immediately outside. This point is in lat. 5° 1′ S., long. 35° 26 W.

The San Roque Channel runs parallel with the coast within the banks above mentioned. The coast itself is fringed by reefs and banks, which vary in their distance and extent; and between them and the outer banks the depth in the channel varies from 4½ to 3¼ fathoms. But at 15 miles northward of Point San Roque is a BAR, of only 15 feet, so that although shelter may be found in the channel North or South of this, it will not allow vessels of any draught to pass through. The channels through the dangerous spots on the banks should not be attempted by strangers.

The coast, although it is low, may generally be seen from the outer edge of the banks, at from 10 to 12 miles off.

It is high water at Cape San Roque at 4½^{h}. Springs rise 8 to 10 feet.

On advancing to the edge of the banks soundings of light sand will be found, with an admixture of broken coral, and a sudden discoloration of the water from its oceanic blue to a green colour.

Beyond *Point Touro*, or the great elbow of land to the northward of Cape St. Roque, the coast, extending W.N.W., is generally low, and has few distinguishing objects. To the south-eastward of Seara [Ciara]. or long. about 38½°, there are, however, many inland and beautiful hills, and the coast is bordered with that remarkable ridge or reef of coral rock, which has been described. This reef, with frequent breaks, continues along shore 19 leagues to the north-westward of Ciara; and within this extent the land is moderately high; but it declines thence westward, and presents a low shore, with sand-downs, some of which are very little above the surface of the sea. The latter will be given in detail hereafter. The soundings, as they generally are off such coasts, are mostly regular, and decrease gradually toward the shore, from a distance of 4 or 5 leagues.

There will be no difficulty in navigating the coast, if proper attention and caution be exercised. A strict mast-head look-out should be kept; the lead should be constantly going; you should be distrustful of your distance from the land, both by day and night; and be acquainted with the tides.

The WINDS and SEASONS of Brasil have been described (69) to (89), pages 52 to 58. For the TIDES, see pages 83 to 86. For the CURRENTS, pages 101, 102.

The *Urca do Cotia*, or *Caboelas*, is the next shoal north-westward of the St. Roque shoals, and bears N.W. 27½ miles from Point Touro, and is 12 miles off shore. At 3 miles West of it is the extremity of the *Lavandeiras Bank*, which joins the coast at *Point Tres Irmaos*, which is W.N.W. 31 miles from Point Touro. To the westward of the Coroa das Lavadeiras is the *Uaca da Conceiçao*, the *Urca do Menhoto*, and the *Urca do Tubarao*, detached shoals, very dangerous, best explained by the charts, and the latter of which is 37 miles W. by N. from the Urca do Cotea, and 12¼ miles N. by E. from Point Tubarao.

From *Caicara*, which is 3 miles westward of Tres Irmaos Point, shoals stretch off the low coast to the distance of from 4 to 5 miles, and so continue past the mouth of the *River Amargoso*, which has a bar nearly dry at low water, and on which is Macau, as far as *Redonda Point*, 5 miles westward of Point do Mel.

ARACATI.—The first port of the Northern coast of Brasil is that of Aracati, on the *River Jaguaripe*, a place of rising consequence. The mouth of the river, as shown in the table of positions, is in lat. 4° 23½′ S., long. 37° 49′ W.

Upon the South bank of the Jaguaripe, at the distance of about 11 miles from the entrance, is the town of Aracati. At the entrance is a bar, narrow and dangerous, owing to sand banks on each side; and upon these the surf is very violent. The sand is so loose at the mouth of the river, that, even with the coasting vessels of the country, every precaution is required. The river widens immediately within the bar, and forms rather a spacious basin; but the port cannot, from the uncertainty of its depth, ever become important, and it has, at times, been nearly choked up.

The town of Aracati, a place of considerable trade, consists chiefly of one long street, extending East and West, with several minor streets branching from it to the southward. Thus far the river is influenced by the tide. At the ebb the stream is fordable; and, as it spreads considerably from the main channel, some parts remain quite dry at low water.

Remarks and Directions by Mr. Dixon.—Vessels from *Pernambuco* on the eastern coast to Aracati, proceed, in the first instance, to the N.N.E., and then North, until they pass Cape St. Roque, and the parallel of the extensive flats, on the North coast, bearing the same name. The latitude of the Urca do Minhoto, the most dangerous reef on these flats, is 4° 53′ S., in the long. of 36° 14′. Having passed these shoals, by running westward, in lat. 4° 40′, or thereabout, on approaching near enough to the shore, Point do Mel will be seen, composed of red cliffs and low white spots of sand on each side of them. Point do Mel is in lat. 4° 56, long. 36° 50′. This point must be avoided, for when it bore about S.S.E., at the distance of 13 miles, we were on a shallow bank, and farther to leeward the water appeared white, and, without doubt, was shallower. It is the Angerstein or Joao da Cunha Bank, which is dry in parts, and consequently very dangerous.* Running along the shore north-westward, and keeping in about 6 fathoms, Point Reteiro Pequeño, formerly called *Cape Corso*, will be seen, and also a mountain, appearing blue, in the interior; the former appears red, being a large bank of red sand, and the latter resembles Bardsey Island, in St. George's Channel. When these two objects are in one, the *Reteiro Grande*, or *Algeberana Head*, will be distinctly seen. The land to the south-eastward of this head for 3 or 4 miles has a very singular appearance, forming like two steps, the lower part being reddish, and the other grey. The head itself is rugged, and has a pinnacle close to its base, which, when bearing W. by S., will appear open.

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* Angerstein or Joao da Cunha Reef.—In the month of December, 1830, the brig *Angerstein*, John Bouch, master, passed through a cluster of rocks, thirteen in number, and apparently from 2 to 3 fathoms under water. The vessel ran close along side of one, which was quite visible under the water, and the master, heaving the lead on it, had not more than 11 feet of water. Mr. Bouch describes the rocks as of a dark brown colour, showing themselves sufficiently for a vessel to pass clear of them; and, before a second cast can be got, you may be in 10 fathoms of water. "They lie in a triangular form, about 10 miles from the land, with Ponto do Mel S.S.E., and the Red Mount on the Reteiro W.N.W. ½ W. about 8 leagues."

In the more exact survey by Lieutenant Vital de Oliveira, they are called the Joao da Cunha Reefs, and are *awash* with many detached heads, and intervening shoal places. Their North point is in lat. 4° 44′ S., long. 36° 56¼′ W. Just South of them is a depth of 10 to 12 fathoms, gradually shoaling to the South. North of them is from 12 to 16 fathoms.

At the distance of about a mile there are several rocks, of which the outermost is covered at high water. It is necessary, therefore, to give this head a good berth, until a large lump or hill, situated on the S.W. side of *Reteiro Bay*, is brought to bear S.W.; then steer toward the hill until Reteiro Head bears E.S.E. With these bearings there is safe anchorage in 3 fathoms of water; or, if the vessel's draught will admit, you may go farther in, and have smoother water, as the rocks off the head break off much of the sea.

Here vessels bound to Aracati generally lie at anchor, while the master proceeds thither overland to inform his consignee of his arrival, draught of water, &c. There is a house at the bottom of the bay for the accommodation of travellers, and further up the valley are some others, where a horse and guide may be procured. The distance from this place to Aracati is about 21 English miles, and a great part of the way is along the sea-shore. The course from this anchorage to the bar of the Jaguaripe is about N.W. ½ N.; the distance 20 miles.

The land in the vicinity of the bar is very barren. On the North side of the entrance is a high red bluff, and also two rocks close to the water's edge; one of these has the appearance of a large gun mounted, with a small fort and flagstaff, and some huts close to it. These objects, together with a spit of sand on the S.E. side, the breakers across the mouth of the river, and the smoothness of the water within them, are good marks by which the entrance may be readily known.

In proceeding toward the bar a low spit of sand will be observed, which forms the S.E. side of the entrance of the river, and a ridge of heavy breakers, parallel to the shore for 2 or 3 miles, without any appearance of a passage. We approached them in our boat, and, perceiving a buoy, we soon got within the breakers, where we ascertained that this was not the channel used by the pilots, although there were 6 feet of water in it at low water. The *best channel* is farther to the N.W., for, besides having 3 feet at low water, it affords an easier passage out, as it lies in a N.E. and S.W. direction; whereas the former lies nearly E.N.E. and W.S.W., and is very narrow.

Both of these channels are liable to shift, and therefore every master ought to make himself acquainted with the state of the bar before he attempts to enter. Buoys or boats may be readily placed in the channel, or perches may be fixed on the spits, or on shore. He should also know the time of high water, and take the bar half an hour earlier.* After passing the boat or buoy that should be moored in the deepest water between the breakers, it will be necessary to haul up S.S.E. or South, to clear a bank on the West side, that nearly dries at low water. On this bank, as well as on that to the north-eastward of it, perches ought to be fixed. So soon as this bank is cleared, the depth will increase, and a westerly course must be taken, in order to pass between the high sandy beach on the starboard and a low bank that dries at two hours ebb, on the port hand. This channel, not a furlong in width, is by the pilots generally called the *Funnel;* and there are usually ten or twelve perches along the edges of the low bank. Having passed this narrow channel, it is proper to haul to the southward, to get under the sandy point on the South side of the river, into smooth water. In advancing toward *O'Neil's Bank*, which must be approached with caution, keep the lead going, and tack in good time, in order to get close to the weather shore. The channel between this bank and the shore is deep and narrow, but, after passing it, there is good anchorage in 2½ or 4 fathoms, where vessels generally anchor when waiting for a wind or tide to go out.

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* If a pilot be on board, care should be taken that, from his ignorance of the English language, he does not confuse the helmsman: a single mistake might prove fatal.

A vessel whose draught of water does not exceed 10 feet (and it would be imprudent to be much deeper for passing the bar) may sail up it at two hours' flood, to *Cook's anchorage*, where vessels generally load; and by waiting for more of flood she may go 2½ miles still further up, and take in a cargo safely.

Sailing out of this port is more dangerous than coming in, as the wind is only favourable for passing the bar during three hours in the morning, and even then it cannot be depended upon. Should it fail, or head in the least, the vessel would be in imminent danger, as a heavy sea is always running on the bar; and the channel is so narrow that anchoring would be useless. When a vessel has been conducted through the *Funnel*, and as far down as the lowest perch, and being on the starboard tack, as much canvas should be set as she can carry, in order to give her good way over the shallowest part and through the breakers.

No vessel should attempt to go out if it has been blowing hard the day before, as a heavy sea will then be on the bar, and probably the breeze not regular.

According to the pilots and inhabitants of the place the channels often shift; the banks being composed of quicksands, the river, when swollen with rains, forces its way through them in various directions, and sometimes forms new channels, so that there is no certainty of their being long in one position. It is also affirmed that the channel is seldom deep enough till after the river has been raised by continued rain; and that in the dry season vessels may be detained for months for want of sufficient water.

The Tide and Current have been already noticed.

Commencing at about 3 leagues from the River Iaguaripe the land, for nearly 4 leagues, close to the sea, appears dark and full, with several openings close to the bays. At about half a league from the commencement of these openings are some white cliffs, in shape like a schooner, with all sails set, and head at East. So soon as this full land terminates, the coast assumes a more flat and level appearance.

IAGUARIPE TO SEARA.—From the mouth of the *Iaguaripe* to *Point Macoripe*, on the East of Ciara or Seara, the coast trends *N.W. true*, and the distance is 20 leagues. The shore is uniformly sandy, but bordered by that remarkable reef which has been already noticed, having many breaks and an interval between it and the sandy shore; but inland are the several mountainous ranges, named *Monte Cascavela*, *Monte Canaveiros*, *Masuranguape*, &c. Pimentel describes a bay, IGUAPE, at about 5 leagues to the southward of Ciara, which now appears to have a village on it, and which, he says, forms a small harbour to the westward of some low level land. The bay is surrounded by very high perpendicular cliffs, against which the sea breaks at half tide. It has a high, round rock, behind or within which is shelter and anchorage in 2½ or 3 fathoms. On the N.W. of this bluff rock you may anchor in the very roll of the sea, as it has 4 and 5 fathoms; and on the strand are pits for watering.

CIARA is the most important town upon this part of the coast. The bay on which it stands is formed by POINT MACORIPE (in lat. 3° 41′ 30″ S., long. 38° 30′ W.) to the eastward, and by the River Papina to the westward, an extent of about 3 leagues. It is extremely open, its greatest depth being about 3 miles.

Lighthouse.—Upon Point Macoripe stands a *lighthouse*, showing a *fixed* light, at 37 feet above the level of the sea, and visible 10 miles off. It was first shown on January 1st, 1847, and, according to the official notice, is in lat. 3° 41′ 10″, long. 38° 35′ 9″, or 5′ further West than we have given it.

Abreast of the town, and at the distance of a mile from the shore, extends a ridge of rocks, level with the water's edge, and within which small craft generally anchor, the entrance to the anchorage being around the eastern end of the reef.

The land within POINT MACORIPE is a high and irregular sand hill, terminating in a point, which has a battery and tower near the extremity. Ships advancing from the N.E. should not approach the point nearer than 2 miles, and should choose a berth without the points which form the bay. His Majesty's ship *Inconstant*, in 1814, was the first English ship of war that had anchored here during the memory of the oldest inhabitants; having brought up in a spot which had previously been occupied by the American frigate *Constitution.*

The *Villa da Fortaleza do Seara Grande*, or town of the fortress of Ciara, is built upon heavy sand, in the form of a square, with four streets, leading from it, and it has an additional long street on the North side of the square, which extends in a parallel direction, but is unconnected with it. The fort, from which the place derives its name, stands upon a sand hill close to the town, and consists of a sand or earth rampart toward the sea, and of stakes driven into the ground on the land side. There is not much to invite the preference given to this spot; it has no river, nor any harbour, and the beach is bad to land; the breakers are violent, and the *recife*, or reef, affords very little protection to vessels riding at anchor within it. The settlement was formerly situated 3 leagues more to the north-westward, upon a narrow creek (*Papina*), where there now exists only the ruins of an old fort. The beach is steep, which renders the surf dangerous for a boat to pass through in making for the shore, and landing is particularly inconvenient. The anchoring ground is bad and exposed; the winds are always from the southward and eastward; if they were very variable, a vessel could scarcely ride upon the coast.

Little of the city is visible from the sea, except the old fortress (La Fortaleza, before described), and the few huts which line its sides. On the left of the town there is a small river, whose banks are adorned with *coqueiros.*

The bay of Ciara opens to the North, forming a regular and spacious semicircular bight. The harbour is said to become annually shallower from the sand filling it up. Mr. Kidder says, in 1842, "At the time of our arrival, a few coasting smacks and an English brig were all the vessels in port. The landing is nowhere good, on account of the heavy surf that continually breaks upon the strand. Adapted to this, the pilot boat in which I went on shore was guarded by strong outriggers to prevent capsizing, but even then did not willingly come in contact with the shore." After conveying passengers from the ship to a fordable depth, they are landed in a *paviola*, a kind of chair elevated on poles, and carried by four men in the same manner as a *bier.*

The *recife* or reefs form a complete ridge, at a considerable distance from the shore, and is to be seen at low water. It extends parallel with the shore for about one-quarter of a mile, with two openings, one above the other below the town. A small vessel may come to anchor between it and the shore; but a ship can bring up in any one of the openings of the ridge, or on the outside of it. A vessel coming in from the northward should make Point Macoripe, which is 2¼ miles to the eastward of the town, with a small fort on it, and may thence bring up in 6 or 5 fathoms. On the appearance of a ship the town fort displays a white flag upon a tall flagstaff.

Northward of Ciara, about a mile from shore, is a rock called *Pedra da Velha*, or the *Old Woman's Rock*, which may be known by the breakers over it. Within this, at half the distance, is another, *Lobvendo;* and next, that portion of the recife within which and the beach small vessels may anchor. Eastward of the latter are three other rocky patches, of which the last is three-quarters of a mile to the West of Point Macoripe; and between this and the point is anchorage, under the latter, in 5 fathoms.

The inner anchorage, before mentioned, is between the recife or reef and the shore. You enter by the eastern channel and go out by the western, when you cannot fetch out by the eastern one. Here a vessel lies at low water, surrounded by breakers, except in the channels; and, as the pilots are very inattentive, it is altogether very dangerous. This is, nevertheless, becoming a place of very considerable trade.

The Baron Roussin, in his "Pilote du Brésil," makes the following remarks on Seara. Ciara is the capital of the province of the same name. Its anchorage cannot be considered as a harbour, being exposed to all winds between N.W. and East, which are frequent hereabout; but the ground is excellent for holding, from 3 miles off the land to the reef, which includes the inner roadstead.

In the outer roadstead, at from 1 to 3 miles from land, are from 6 to 10 fathoms of water; bottom of soft sandstone covered with sandy oaze, and in which the anchor holds well. The coasters enter the inner road by two passes formed in the reef, at 200 fathoms asunder; the depth in these passes is about 13 feet at high water. The export trade of this place is chiefly in cotton, hides, and the dried meat whereof there is so great a consumption in the southern provinces.

ON THE ANCHORAGE OF CIARA, BY LIEUT. D'ELISSALDE, OF THE FRENCH MARINE, COMMANDING THE GUN BRIG LA VIGIE.

The road of Ciara is formed of reefs, which render its approach dangerous. On the easternmost part, or Point Macoripe, a LIGHTHOUSE has been built, elevated 40 feet. This light is fixed, and is visible about 12 miles off. It has been shown since January 1, 1847. The westernmost point terminates in a sandy beach. When you pass near the shore you should guard against some small rocks, which have not been shown on the charts.

To reach the anchorage, get as much to windward as will allow you to bring the East point of the *Serra Guguba* to bear South; it is then in a line with the *Miretes Reef*. The light of Macoripe will then bear S.E. ½ E., about 1½ mile distant, and the summit of Jua to S.W. You will then be at the entrance of the channel, and thence steer on towards the Serra de Jua until the eastern angle of the fort bears South. Steer then for the fort, and you will reach an anchorage.

At the anchorage of La Vigie we found the depth to be 19 feet at low water, to 28 or 30 feet at high water, which gives a mean depth of 25 feet nearly. You must moor and run out 20 fathoms of chain to each anchor, and the holding ground is so good that a vessel never drives.

The road is open from W.N.W. to E. by the North, so that it is exposed to all the winds that are to be feared, the land or southern breezes being always very weak; the reefs break off the swell, but you always roll a little, the swell coming constantly from the N.E. Landing is very difficult, for the sea breaks with great violence on the sandy shore, and it becomes impossible at high water, under pain of losing your boats. It is advisable at low water to fix a grapnel off-shore, so that you may always keep your boats to the swell by means of it.

Watering is difficult, the boats keeping some distance off; the getting large casks on board at low water is most troublesome, and is impossible at other times. You are also very fortunate if you get the water; we were enabled to do so by the kindness of the American consul, who readily placed his well at our disposal. The inhabitants procure water by digging a few feet in the sand, but the quantity gained thus is very insufficient. Every ship therefore freighted with cattle should be prepared accordingly, as I believe it is impossible to procure the necessary quantity for this service at Ciara. According to our pilot, there is a watering at the anchorage of Macoripe, where watering is an easy task.

COAST WESTWARD OF CIARA.—From off Ciara H.M.S. *Sapphire* proceeded on a N.W. ¼ W. and N.W. course, along the land, at not more than 4 miles distance, in from 13 to 11 fathoms, until she arrived at the village of *Curú*, a distance of about 10 leagues. When abreast of it, says the Captain, the decrease of soundings to 9 and 7 fathoms warned me off. There is a heavy breaking shoal extending from the point on which this village stands; and in case any one not knowing his longitude should make it, it may not be amiss to state that we saw catamarans, with their sails hoisted to dry on the beach, which had exactly the appearance of large boats sailing upon a river, until the regularity of their distance and a nearer approach dispelled the illusion.

Hauling out from Curu, the water did not deepen for a considerable time. By the *Sapphire's* observations, Curu appeared to be in lat. 3° 28′ S., long. 39° 0′ W. In the

Baron Roussin's chart a village, probably intended for the same, is represented in 3° 30′ S., and 38° 52′ W.

Resuming the coast at Ciara, we now proceed to observe that from Point Macoripe the coast trends *N.* 56° *W. true*, to the meridian of *Mount Melançia*, a distance of nearly 19 leagues. This mount, so called, is an insulated sand-hill near the coast. In the intermediate distance you pass, successively, before the mouths of the *Papina* or *Rio de Ciara Velha*, *Rio Cioppé*, and *Rio Curú*, with the *Morro* or *Hill of Curú*, and the *Serra de Mandahu*, in the interior of the country, called also the *Serra Grande*.

All this coast is sterile and desert in the part next the sea, and shows no trace of culture nor inhabitants, it being one undiversified series of low downs and loose sand. The coast is clean; and, at 2 or 3 miles from it, are found from 6 to 13 fathoms of water, with fine grey sand.

From Mount Melançia the coast takes a more westerly direction, and trends *N.* 64° *W.*, *true*, 11 leagues, to a village named *Almufedas;* then *N.* 69° *W.*, 5 leagues, to *Point Tapaji.*

The village of Almufedas, standing within the sand-down on the shore, is situated on the border of a small river, *Aracati Mirim*, navigable by coasters. From the offing its steeple may be seen among a group of cocoa trees. It stands in 2° 56′ S., and 39° 58′ W.

This village serves to indicate the commencement of a bank which extends thence nearly to the little hamlet of Jericoacoara, situate about 40 miles more to the westward.

DESCRIPTION OF THE COAST CONTINUED.

Between Point Trapaji and the Point of Jericoacoara, before noticed, the coast trends nearly East and West, in a distance of 9 leagues; from Jericoacoara to the mouth of the *Rio Camucin* or *Camosin* it forms a slender bay, in extent 6 leagues; from the Camucin to another river, the *Tamonha* or *Tamonia*, it again trends nearly West, 5½ leagues; and from the latter to the *Iguarassu* 6½ leagues.

Off Mount Melançia (long. 39° 18′), before noticed, a bank commences, which thence extends all the way to the River Iguarassu, an extent of 45 leagues. This bank, which is called in the country *Pracel de Caracu*, from the name of the most considerable hamlet on this part of the coast, extends outward about 3½ leagues from the shore, and is circumscribed by the depth of 6 fathoms. Upon the bank of the village of Almufedas, there are 4½ fathoms at 5 miles from the shore; and at 3 leagues North from Point Trapaji are 6 fathoms; and there are similar depths thence westward all the way to the Iguarassu. From the edge of the bank, in 7 fathoms, the water gradually shoalens to half a fathom near shore; but, owing to this gradual decrease in depth, there are no breakers. Those approaching may, therefore, advance safely, by keeping the hand lead going.*

Large vessels coming in from sea, and proceeding westward, should keep off, at 4 leagues from the land; the coast being so low that, at a safe distance, the tops of cocoa trees only can be occasionally seen, and in the finest weather.

When you have advanced to about 8 miles from the coast, on the meridian of Caracu [40° 11′ W.], and continue on a westerly route, upon approaching a little nearer to the land you will discern some huts, which form the hamlet of *Castelhamos;* but this is not requisite for a vessel of any size; and those drawing 15 feet of water should not come nearer to the shore than 10 miles, where they will find 6 or 7 fathoms and less water, as well as to the westward of the meridian of Jericoacoara.

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* The coasters, having nothing to fear, sometimes enter, according to their draught of water, the mouths of the little rivers *Tapaji* and *Caracu.*—*M. Roussin.*

When you may be westward of Jericoacoara the draught of the vessels and soundings will determine the distance to which it may be proper to approach the bight. The bottom here has been represented as sufficiently clear to allow a vessel to come in without danger, and as having 4 fathoms of water at half a mile from the cove.

JERICOACOARA.—This bight or cove is formed by the broken ridge or ledge of rocks, with which the coast is bordered, into a small basin between them and the shore. The waves commonly beat high on the reef, and break over it into the tranquil basin. On the shore may be occasionally seen the temporary huts of the *Sertanejos*, or the inhabitants of the *Sertao* or interior country. These huts are formed of perches fixed in the earth at one of their extremities, united at the other, and covered with cowskins as a protection from the wind: they appear to remain only while the coasters come to take off the hides, &c., which are sold here, and which are produced in great quantities by the cattle in the neighbourhood.

By digging pits on the beach hereabout potable water may be obtained. Spring tides in the basin were found to rise from 10 to 12 feet.

According to M. Roussin the down which forms the eastern shore of Jericoacoara stands in lat. 2° 47′ 28″, long. 40° 27′ 16″.—Variation of the needle, at 2 leagues to the northward, in January, 1820, 2° 23′ W. At present it is 3° 30′ W.

The coast which follows Jericoacoara, to the westward, is a low shore of white sand, having, in the interior, clumps of small bushes, and without it the ridge or border of rock. Hence follow, in succession, as shown in the chart, the mouths of the little rivers *Camucin* or *Camosin*, *Tapuya*, *Tamonha*, &c., which may be seen on advancing very near to the shore. The first of these is the only one navigable for coasters of any draught; the others will admit boats only.

At from 1 to 4 miles of distance from this coast are found from 4 to 8 fathoms of water, bottom of oaze, sand, and madrepores, or coralline substances.

The PERNAIBAO, or PARANAHYBA, &c.—The *Rio de Pernaibao*, or *Paranahyba*, is one of the largest rivers in Brasil; and, in a commercial point of view, is of the highest importance. It is formed by three streams of the same name, that take their rise in the borders of the Sierra, which bounds the province of Piauhy on the S.W. [Lat. 10° 45′ S.] The portion of coast between the *Barra de Iguarassu*, the easternmost branch of the *Rio Pernaibao*, and the *Barra de Tutoya*, its westernmost, has generally been exhibited very incorrectly in the charts. The distance between the mouths is between 9 and 10 leagues, within which extent the Rio Pernaibao, or Paranhyba, discharges itself by four others, namely, the *Barra Velha*, and the *Barras do Meio*. *do Caju*, and *das Canarias*. All these openings are formed by a group of low isles, composing the *delta* of the Pernaibao, and the five of which, next to the sea, afford excellent pasturage for cattle.

The Harbour of Tutoya, on the West, has been described as the only harbour along the extensive line of coast between Bahia, in lat. 13° South, and the Marañon, under the Equator, that admits of the bar being crossed at all times of the moon, by vessels drawing from 14 to 15 feet of water.

The Bar of Iguarassu, and the Barra Velha, the two easternmost passages, have become unnavigable for ships; and in consequence of the formation of sand banks to leeward, vessels now proceed to enter by the *Barra de Tutoya*, for which branch of the river a pilot may be obtained.

The Bar of Tutoya is described as of great breadth, some say 6 miles. The masters of two English vessels, who have sounded on it, never found less than 5 and 6 fathoms of water; but, as it has not yet been correctly surveyed, caution is required.

The charts have exhibited a rock, called *Pedra do Sul*, between the Barra Velha and Barra do Meio; but M. Roussin says that this is not a danger really to be feared, being only a break of the reef on the coast, and does not extend more than a mile along shore. On approaching the coast hereabout, in fine weather, you may see, at the distance of 10 or 12 leagues to the south-eastward, the high lands of the interior, named the *Serras dos Covos*, *Serras de Hybiappaba*, which are the last mountains that come in sight between this and Maranham to those proceeding westward.

It is advisable not to approach the coast of the embouchures or mouths of the Pernaibao nearer than to 4 or 5 miles, and not further in than to a depth of 8 fathoms. The sea is very muddy, and the bottom of oazy sand, before these passages; the ground is therefore bad for anchoring. Eight or 10 fathoms may be found at 4 or 5 miles from land.

To the West of the Port of Tutoya the coast gradually abates in height. The shore is composed of flats of sand, with woods in the interior only. The coast exhibits sand-hills, of a shining white colour, without any verdure; and having the appearance of linen cloths, or extended sheets, they have received the name of *Lançoes Pequenos* [*Little Sheets*], in contra-distinction to a more extensive range to the westward, named *Lançoes Grandes* [the *Great Sheets*].

The Lançoes Pequenos occupy an extent of coast terminated on the West by the *River Perguiças*, near which are some breakers of the same name.

The River Perguiças separates the Lançoes Grandes from the Lançoes Pequenos. A long spit extending from this river is formed, as are all the banks, and even the islands on this coast, by the tide of the river meeting the current of the sea. H.M.S. *Sapphire* crossed this bank by night in 5 fathoms, and the *Mersey* in 3½, but in 7 fathoms a ship will be quite close enough.

If the coast be made from the *northward*, about the Perguiças and Lançoes Pequenos, soundings will be struck in 19 or 20 fathoms, and soon after in 13; and from thence regular bottom will be found in 10 or 11 fathoms, until the vessel is close enough to haul off and steer along the land. The land hereabout is green, interspersed with sand-hills. It is low and irregular; but in one place there is an extent of a mile or white sand, crowned with green of a regular height.

In keeping 8 or 10 miles from this part of the coast you will be at a sufficient distance to avoid all danger; and thus you will have from 7 to 14 fathoms of water.

The River Perguiças is sufficiently deep for a large and well-constructed brig to anchor some distance from its entrance; but the interior navigation is reported to be difficult.

Elissalde Bank.—On March 1, 1849, Lieutenant D'Elissalde, in the French schooner *La Vigie*, in beating up from Cayenne to Ciara, in 30 to 35 fathoms, suddenly fell on a bank of 11 to 13 fathoms, about 1 mile or 1¼ mile in length. The depth appeared to be even on it, and no ripple or change of colour would indicate its existence.

It is about 35 miles from the coast of Brasil, N.N.E. of Paranahyba, and its South part is in lat. 2° 17′ 25″ S., long. 41° 52′ 17″ W.

LANCOES GRANDES.—The coast to the West of the mouth of the Perguiças trends *N.* 65° *W.* to *N.* 80° *W.*, on an extent of about 17 leagues. It resembles that which precedes it to the East. Its downs are of shifting sand, of a moderate height, and their extent very near 12 leagues. Nothing can more resemble white sheets extended on land; and this aspect is very remarkable and useful, as a landfall, to those coming in from sea when bound to Maranham, &c.

According to M. Roussin the eastern extremity of the Lançoes Grandes is situate in lat. 2° 34′ 12″ S., and 42° 44′ 52″ W.; the western extremity in 2° 21′ 0′ S., and 43° 12′ W.

Emily Shoal.—This shoal, which was discovered in 1837, by the grounding of a French vessel, lies in about lat. 2° 18′ S., long. 43° 7′ W., *nearly* where 4¼ fathoms are marked in the chart. The following is the notice of the shoal by M. Charles Leraistre, commander of the ship *Emily*, of Nantes :—

"When passing the Lançoes Grandes, and N. by E. of the most remarkable sandhill, 7 or 8 miles from land, in 7 to 9 fathoms, at 12^h 30^m p.m., the *Emily* got into shoal water upon a bank of 2¼ fathoms, which appeared to be of small extent, around which I found 7 fathoms. The vessel was going two knots at the time, and at noon was in 2° 20′ 2″ South latitude.

"The bank is situated within a very little of the track of the sloop *La Bayadère*, and where 5, between 7 and 9 fathoms are found. It is probable that this sounding was obtained on the edge of the shoal water, for I think that a vessel running 4 knots would cross sufficiently rapid, so as to get only one shoal sounding.

"This bank is very dangerous, because it is situated in the route that a large vessel would take, and at a distance from the land that would remove all apprehension of danger. It was at low water when I touched, or thereabouts, and from aloft only one green patch of trifling extent was to be seen, resembling others on these shores." It will be again noticed.

MANGROVE COAST, &c.—Immediately to the West of the Lançoes Grandes the coast entirely changes its aspect. Instead of being arid, and devoid of verdure, it now appears as if wholly covered with bushes and groves, so closely set that, at the distance of 4 miles, the ground between them is not to be seen. The shore is low, and is called the *Praya das Mangues Verdes*, or *Beach of Mangroves*. The sudden transition of colour here, from that of the Lançoes, renders it impossible to mistake this portion of coast.

The portion of coast, several miles to the westward of the meridian of 43° 24′, turns abruptly to the West, and southward of West. Here you have in sight the Island of St. Anne, which forms, with the continent and the Isle of Maranhao, or Maranham, the grand inlet called the *Bahia de St. José*.

ISLE OF SANTA ANNA.—This isle, or rather cluster of islands, a little more elevated than the lands which precede it to the East, is equally covered with mangroves and other trees: and, with the exception of its lighthouse, offers nothing remarkable when it first comes in sight. On advancing, however, you will see the breakers which lie about to the eastward of it, of which the easternmost are 8 miles from the N.E. point of the island. Near these shoals are from 7 to 24 fathoms of water; bottom of sand. There is shelter under the S.E. part of the island, as was found by Captain Gales, at the unfortunate loss of the *Vancouver*, mentioned hereafter.

To the West of Sta. Anna's Island will be seen the breakers of the Corona Grande, a vast flat of rocks and sand, nearly even with the water, and extending about 5 leagues to the northward from Maranham Island.

LIGHTHOUSE ON STA. ANNA'S ISLAND.—This lighthouse, which was first lighted on the 1st of June, 1831, was described in the notification as a square tower, having three distinct stories, each story diminishing as it rises. Its full height is about 90 feet above high water, spring tides; but it is in a ruinous condition, and may have to be discontinued. It shows a *revolving light*, visible every thirty seconds, for about ten seconds together.

The inlet of Bahia de St. José, between the continent and Maranham Island, is too shoal and dangerous for a passage to the port of Maranham, even for small vessels. The general entrance is, therefore, by the Bay of St. Marcos, to the West of the Corona Grande, as will be shown hereafter.

The tide, as before noticed, sets with great strength into the Bahia de St. José On the first time the *Sapphire* ran along the coast she was set inside the reefs, obliged to anchor in 5 fathoms, and was thence compelled to steer out on a N.E. course, in order to get clear of them. The breakers, however, as we have noticed, always show themselves, and should be rounded in no less than 14 fathoms.

The same ship found anchorage in 7 fathoms, with the lighthouse on Sta. Anna's Island bearing W.S.W. ½ W., and Mangrove Point S.E. ½ E. Within the reefs the ground is bad.

Captain Hewett's R.N., Description of, and Directions for, the Navigation from Ciara to Maranham.

"From Ciara the coast trends N.W. by W., 35 leagues, to *Point Tapaji*, and thence West, 10 leagues to *Jericoácoará*, the depth gradually increasing off-shore; but a N.W. course should be pursued, in order to avoid the shoal parts of the *Bank of Caracu*. Having run 100 miles upon the N.W. course, allowing 1½ mile per hour for the current's assistance, in soundings varying from 11 to 20 fathoms, change the course to W. ½ N., which is nearly the direction of the coast from Jericoacoara to Mangues Point; and it will give you a sight of the land as far as the Island of Sta. Anna.

"When ships are bound to Maranham, from seaward, it is absolutely necessary to make the land considerably to the eastward, as the currents in general set very strongly between W. ½ S. and W.N.W. If, in endeavouring to make the land, you should be in latitude about 3° S., on discovering it, you will be off Mount Melançia, or between it and Ciara; if the latter, three other mountains will be observed to the S.S.E., lying nearly S.E. and N.W. of each other, which mountains are about 7 leagues to the westward of Ciara, and are easily seen from that place. About this part of the coast you will have a bottom of fine sand and shells.

"If you should make land when you consider yourself in from lat. 2° 15′ S. to 2° 30′ S., and have a bottom of small red and white stones, you will be off Jericoacoara. If the bottom consists of yellow, blue, and red stones, you will be off the *Paranahiba* or *Tamonia*; and three mountains, lying nearly in the meridian of each other, in the neighbourhood of the latter, will be seen.

"The whole coast from Point Macoripe to Paranahiba is sandy to about half a league inland, whence it appears well cultivated; so that it is easily distinguishable from the coast between Paranahiba and Green Mangues (Mangroves) Point, which consists of nothing but sand, without the least sign of vegetation.

"Inclining to the shore, and observing the *Lancoes* or sand banks well, as you pass along, the entrance of the River Perguiças will easily be distinguished. The sand will now begin to assume a higher and more irregular appearance; this height and irregularity does not, however, deserve the appellation of hills. When the Perguiças bears S.S.E. you will begin to shoalen your water to 8 or 9 fathoms, but a steady course should be pursued, as you will presently pass a spit formed by the sand washed from the river, and which, meeting the natural course of the current in the offing, inclines it to the N.W.

"If the day should be far advanced, when you are off this part of the coast, haul to the wind under topsails and foresail for the night, standing off into 22 or 24 fathoms, and on into 12 or 14 fathoms. It would be advisable to haul the wind before you are past the Perguiças, as otherwise you may be short of daylight for the operations of the ensuing day. At daylight you may bear up under all sail, pursuing the former course and distance from the shore, and toward the conclusion of the sand banks (*Lancoes*) the land will begin to appear a little more fertile, and Green Mangues Point will easily be distinguished."

On the shoals eastward of Sta. Anna Island the following remarks were made by Captain Livingston, on his voyage of 1824.

"A dangerous shoal exists at about 10 or 11 miles to the eastward of Sta. Anna's Island. Many vessels have narrowly escaped it. We got into 3 fathoms, with Sta. Anna bearing W. by S. The bottom was of fine sand, in ridges, with even 10 fathoms between. But I have no doubt that there are also coral rocks, from the manner in which the sea broke, a little to the westward of us. About the same time, a French brig in company, the *Cæsar*, of Marseilles, struck, and unshipped her rudder at about 1½ mile to the N.E. of us, though her master assured me they had never found less than 6 fathoms. We had one cast of only 2 fathoms, but did not touch. So the lead must either have hit the top of a coral rock, or else a knob of sand.

"The Island of Santa Anna shows quite level in the direction we made it, and I think cannot be less than 12 miles long, in place of 2 or 3 commonly laid down. I have spoken with many who concur with me in this opinion, and one who has been on it states it as 12 miles long, and 3½ or 4 miles broad.

"From the appearance of the land,* and the depths of water, both the French Captain and myself thought we were on the *Coroa Grande*, or *Grand Crown*, to the westward; and as night was rapidly coming on we both anchored; we, in 9 fathoms, and he, at half a mile West of us, in 25 fathoms.

"The Cæsar's Shoal (so called by me from the French brig above mentioned) lies about 2 miles South, and as much East of the place we anchored at the evening after we were in such shallow water on it. The shoal I consider very dangerous, and think it extends 3½ miles East and West, and 3 miles North and South; but there is at least one other at a short distance South of it.

"I have conversed with several intelligent masters, who have been in the Maranham trade. Many have seen it. All of them seem to think that the safest mode for those bound to Maranham is to get into about 2° South or a little to the southward of 2°, and run, with great caution, until *Mount Itacolumi* (on which now stands a lighthouse) on the western side of Maranham Bay, and which cannot be mistaken, is seen; and I incline to their opinion: as thus, though it may occasion a little more watchfulness, repays it in safety; keeping vessels clear of the Cæsar Shoal and the Coroa Grande, as well as making them sure of not getting into the Bay of St. José.

"It is to be observed that the Cæsar's Shoal lies in the very track formerly pointed out in the Sailing Directions for making Sta. Anna; and if the frigate *Inconstant* had run on her course a few miles further, as shown in the chart by Captain Hewett, without hauling up, she must have discovered it."

The foregoing account of the Cæsar Shoal has appeared in our works since the year 1825, and that of the Emily Shoal, on the preceding page, since 1838: yet they were entirely omitted in an Admiralty chart issued in 1860. In the confidence induced by the official claims to infallibility, Captain Gale, of the *Vancouver*, of Liverpool, 456 tons, bound for Maranham, having made the Lançoes Grandes, steered W.N.W. and struck on the Emily Shoal, sustaining much damage. She then steered N.W. by W., and again struck about 11 a.m. on the precise spot indicated above as the Cæsar Shoal, but shown as clear of danger in the captain's chart. She soon became unmanageable, and finally sunk in the Bay of San José on the West side of the island. The crew and portion of the cargo were saved. In the judicial inquiry instituted, the foregoing facts were established, and Captain Gale's certificate was immediately returned, as he was not responsible for the disaster.

Captain Hewett's Directions go on as follow:—"When you lose sight of the Island of Sta. Anna, bearing about S.S.E., you will be abreast of the Great Crown Bank [*Coroa Grande*], and should keep a good lookout to the southward from the masthead; and if breakers should be discovered, or if you shoalen your water to less than 18 fathoms, haul out half a point, but no more. Your distance to be run on a N.W. by W. course will be about 13 miles, and on the westerly course, 11 miles, including 1 mile per hour upon each for the assistance of the current, before you alter the course to W.S.W.; which having done, without fear, look out for *Mount Itacolumi* ahead, and the *Tapitapera* coast on the port bow." This mountain, with its lighthouse and coast, are described hereafter.

M. Roussin says that the breakers of the Coroa Grande, with those of the Isle of Sta. Anna, may sometimes in clear weather be seen from the mast-head at 3 leagues off, and from the deck of a corvette, or sloop, at half this distance. They are divided into several groups, and always show, although the tide rises 12 feet. The only difference in their appearance is produced by the state of the tide, or the greater or less elevation of the waves. The northernmost point of the breakers of the Coroa Grande is given by the Baron as in lat. 2° 10′ 50″ S., long. 43° 57′ 32″ W. Captain Hewett previously gave as very nearly the same.

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* It is to be recollected that, at this time, the lighthouse was not erected.—Ed.

On approaching the Coroa Grande from the North, when the sky is not clear, you may distinguish the coast of Maranham Island from that of Sta. Anna by its being higher, its masses woody, the configuration varied, and a bald white shore on the North.

MARANHAM.—DESCRIPTION, &c.—The *Bay of San Marcos*, or Maranham Bay, is comprehended between the Island Maranhao and the continental coast on the West. Its principal entrance lies N.N.E. and S.S.W. The bay is navigable, in the greatest part of its extent, for large vessels, and frigates may anchor before the *Harbour of St. Luis*, the principal part of the bay, situate on the coast of Maranham Island.

The entrance of the bay, being limited on each side by the dangerous shoals shown on the chart, must be approached with caution.

ST. LUIS.—The city of St. Luis, the capital of the province of Maranham, is the seat of government and of the bishop. It occupies two small hills, situate at a short distance East and West from each other, and separated by a little valley. Several buildings are remarkable for their size, particularly the public edifices, several convents and churches, of which the principal is the cathedral, occupying the North side of a square plain, covered with grass, and lying before the palace of government. The streets are generally at right angles, but the inequality of the ground renders a walk fatiguing.

Vessels may find at Maranham the chief resources required by the exigencies of navigation. The safety of the port permits careening; the water is good and abundant, and on the island beef and rice are equally gotten; but, if in want of considerable quantities, they may be most advantageously obtained on the Alcantra or continental coast; because this is, in every respect, more fertile than the island, and more abundant in cattle, fruits, &c.

M. Roussin says that the temperature of the air is very high in the city; more especially from the month of December to that of June. St. Luis, standing on the West side of the island, does not experience, generally, the salutary winds from the eastward; those which arrive being very weak.

With regard to the winds, and other phenomena, the year may be here divided into seasons; winter, which begins in December and ends in May; and summer, which prevails during the other six months. The first of these two seasons is that of the rains; they fall abundantly, and are accompanied with violent storms, especially in the months of February, March, April, and a part of June. The thunder and lightning are then almost permanent, and in the squalls the wind blows from the North to the S.W. by S. Nevertheless, they do not experience at Maranham *hurricanes*, properly so called; and, even in the worst times, there are long intervals of tolerable weather. There are frequent falls of rain in the summer; and, in this season, the regular winds are mostly from E.S.E. to N.E. by the East, these being the *general winds*.

The air at Maranham is generally healthy; but in the season of the rains fevers of a dangerous nature at times prevail, though they commonly yield to appropriate treatment.

SAILING DIRECTIONS FOR MARANHAM.

Our actual knowledge of the approaches, and the details of the navigation near Maranham, have been comparatively imperfect, inasmuch as a considerable period had elapsed since Captain Hewett surveyed the immediate neighbourhood of the city, and the changes, which necessarily occur in many minor particulars of the banks and channels, rendered our instructions somewhat incomplete.

We are now, however, enabled to give complete and recent instructions for the coast between this and Para, as the French Government have surveyed and published a series of charts of the whole of these coasts left untouched by Admiral Roussin.

The first officer who endeavoured to improve our knowledge of this coast was M. Ch. Philippe de Kerhallet, Lieutenant on board *L'Adonis*, between 1837 and 1840, and whose directions were published in 1841. But the principal, published in 1846, are those of Captain L. Tardy de Montravel, of *La Boulonnaise*, employed on the survey in 1842 and 1843. From the works of these officers we have corrected our former descriptions, and extracted from them what was necessary to complete the instructions.

We shall first give the directions by Admiral Roussin, and then, though at the risk of repetition, those of M. de Montravel.

DIRECTIONS FOR MARANHAM, BY ADMIRAL ROUSSIN, 1827.

The winds in the environs are mostly from the eastern quarter. It is, therefore, to the eastward that the coast is made, whether arriving from Europe, Guyana, or the West Indies. The only exception is with wind at times between the North and the West. At all other times you gain a sight of the Lançoes Grandes, before described. This shore of white sand may be seen to commence about 20 leagues E. by S. from the Isle of Sta. Anna, and extends, as we have shown, to the verdant coast of Mangrove, which terminates in a great elbow of land, under the meridian of 43° 28′ W.*

Off the coast, at 4 or 5 miles from the Great Lançoes, are from 5 to 6 fathoms of water, but by an error in longitude, very presumable hereabout, you may easily mistake the *Smaller* for the Greater Lançoes; but observe that, when off the latter, you will have the shoal grounds of the River Perguiças to the East, in place of being to the West while off the former. In order to avoid all uncertainty in this respect, hold off to 10 or 12 miles from the coast, and continue your course from 6 to 10 fathoms. At this distance from land you will be between the parallels of 2° 15′ and 2° 30′ S., on a mean direction of W.N.W., which is that of the coast.

Having reached the meridian of 43° 20′, which is that of the middle of the beach of *Mangues Vertes*, and at 7 or 8 miles from shore, you must shape a course northward, in order to avoid the Cæsar's Reef and St. Anne's Breakers, which exist as before described.

Mark well that, in this traverse, the tide will require attention, and a due allowance for it must be according to its direction and strength. The flood on this part of the coast, as already noticed, sets to the S.W., and ebb to the N.E., sometimes with a velocity of 2 miles in an hour.

There is a considerable resemblance in the Isle of Santa Anna to the beach of Mangues Verdes, but it is more elevated. It ought not to be mistaken for it, as they are separated by a large open space, whereas the coast is altogether interrupted.

Having passed the breakers to the North of the Isle St. Anna, which may be known by the lighthouse, continue to steer to the West several degrees North, until you come in sight of the breakers of the Coroa Grande, which may be approached to the distance of 2 miles.

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* *Blaesdale's Coral Reef* (?)—On the 15th of October, 1819, the brig *Richard*, of Ulverston, Captain Blaesdale, is said to have struck on a reef, in about 0° 56′ or 0° 57′ North of the Equator, and long., by account, beyond 41° W. But Lieut. Lee, in the U S.N. brig *Dolphin*, obtained a satisfactory sounding of 2,980 fathoms on the spot, and others of 1,000 and 2,000 fathoms. no bottom in its vicinity. This decides its non-existence.

You may, perhaps, recognize the breakers of the Coroa Grande by the quality of the bottom, of fine sand with black and reddish specks, which soundings become very frequent when you arrive on their meridian; but we repeat, that if the land has been made as we have advised, there cannot be the least doubt as to the position of the vessel, when you see the Coroa Grande; if you have made the Lançoes Grandes throughout their extent, you will have run along a space of 30 leagues perfectly determined.

From the North point of the Coroa Grande two routes present themselves for entering the Bay of San Marcos, and afterwards the anchorage of San Luiz.

The first is by rounding, by the North and West, the Coroa Grande, by means of the land; the depth in doing so ought never to be less than 9 to 11 fathoms, while you follow the edge of the bank, and then running along the western shore of Maranham, of which you may see the North part at the same time that you do the breakers, if the weather is clear. Independently of the greater height of its coasts, the Island of Maranham is distinguished from that of Santa Anna, in coming from sea, by the white cliffs on its northern part.

The first point of Maranham, which will be seen to the southward, on passing the banks of Coroa Grande, is that of *San Marcos*, or *St. Mark*, which gives its name to the bay. It is a high, bluff point, and on its height is a guardhouse and signal staff. A broad shelf extends from and to the S.W. of the point, along the coast, with flats of rock and sand to more than 700 fathoms from the shore, which must, therefore, be approached with caution.

On continuing the route to the S.W. and S.W. ¼ S., you will make the parallel of the little fort *San Antonio de la Burra*, situate on the point *das Areias*, or *Areas*, which is the North point of the entrance of the harbour of St. Luis. Here ends the flat of rocks and sand above noticed, and to the point you should not approach nearer than half a mile, at which distance may be found from 35 to 40 feet of water, where you may anchor.

The best and most frequented route to St. Luis is taken by gaining a sight of the *Morro Itacolumi*, before mentioned, a small mountain of the continent, upon the western coast of the Bay of St. Mark, nearly on the parallel of the North part of the Coroa Grande. This mountain resembles in shape a pointed cap with very broad sides. It is entirely covered with bushy trees, and may perhaps be seen at 5 leagues off, in clear weather. By this insulated hill the coast may be readily known. The land to the North of it suddenly taking a western direction, and to the southward are red cliffs, trending S.S.E. There is no similar mark in the vicinity; and it is, therefore noted both on arrival and as a point of departure.

The LIGHTHOUSE is a quadrangular building, erected on the cliff of Mount Itacolumi, the sides of which face the cardinal points, and is 75 feet high from the base, and 147 feet above high water mark. It shows a revolving light of two distinct colours, one being of the natural appearance, the other of a *red* colour, these lights being alternately visible and invisible for about two minutes in each revolution. It was first lighted on January 1st, 1839.

On approaching Mount Itacolumi, it appears in the shape of a gunner's quoin, and is remarkable only from the low land in the vicinity. From the lighthouse on Sta. Anna's Island it bears W. ¾ N. nearly 15 leagues. When this mount is descried, shape a course to bring it to bear W.N.W., and, according to judgment, about 4 leagues distant.*

When you are within 6 miles to the East of this lighthouse, and about to enter the

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* From this spot *Ponta Tatinga*, or *Alcantra Point*, will be open of Point Piraremo, and bear S.W. by S. Here anchor, if the night is far advanced, or the weather thick.

Bay of St. Marcos, the route is due South, 16 miles, that is to say, to the parallel of, and a league to the East of Point Tatinga. From this position you can steer S.S.E. directly for the point of San Marcos; but you must not steer this direct course while the ebb tide or high water lasts, in order to avoid being driven by the flood on to the north-east point of the Bank da Cerca, on which there is but little depth at low water. It will be better then to steer 4 miles to the S.E. from 3 miles East from Tatinga. This route will carry you nearly 2 miles to the N.E. ¾ N. from Point San Marcos. From this last position run along the coast of Maranham, at 700 or 800 yards distance, in 9, 12, and 8 fathoms, to the anchorage, as directed in the first route.

In all the extent of this passage from the parallel of Itacolumi, the only attention required (besides sounding continually, as indeed ought always to be done while near shoals or land) is to keep, until you are on the parallel of Point Tatinga, to the West of the North point of the only danger, which is called by some here the Middle Bank (Bank do Meio);* and to do this it will be sufficient to keep 4 or 5 miles from the coast of the continent, as you run along it to Point Tatinga. After having advanced thus far toward the entrance, and having crossed the bay to find the Point San Marcos, you will have a good mark to assure yourself that you are to the East of the Bank da Cerca, and at a sufficient distance from the bank and from the coast of Maranham; it is to steer so as to keep a small space open between the two small islets (Espera Isles) lying to the South of the Isle do Medo.

St. Mark's Point, having on it a square tower, cannot be mistaken. On approaching the point, a sandbank, dry in many parts, will be seen at about 2 miles N.N.E. of it; the *Banca da Cerca*, or *Acercas Bank* to the westward, will also be seen breaking in many places. Between these is the channel to St. Luis Roads. On passing St. Marcos Point the rocks will be seen to the westward of it; but by giving them a sufficient berth, and bringing the body of the *Isle do Medo* to bear S.W., and the fort on *Ponto das Areias* South, you anchor in 15 fathoms, sand and mud. On the foul ground off St. Mark's Point many anchors have been lost.

The best anchorage before the mouth of the harbour, is at 600 fathoms to a mile from Fort St. Antonio, or Ponta das Areias, with the fort bearing S.E. by E. ¾ E. In this position there are from 30 to 45 feet of water, at low ebbs. Small vessels go higher up, toward the bank of the Isle do Medo.†

The anchorage before St. Luis is bounded on the South and south-west by the *Ponta da Guia*, appertaining to Maranham, by the Isle Medo, and several shoals, on which there is little water at low tides; to the East and the N.E. by the coast of Maranham; to the S.E. by the banks which bound the South side of the entrance into the harbour; lastly, at about 2 miles to the N.W. by the Bank da Cerca, before mentioned, and which has, in some places only 6 feet over it at low water.

Beside the passage on the N.E. of the bank, leading to the anchorage, there is another on the S.W., between it and the Isle Medo, but the latter is taken only with winds between North and South by the West. When they are easterly it is obvious that, for attaining the roadstead, the passage by the Maranham coast is always preferable.

The entrance of the Harbour of St. Luis is not difficult for small vessels, but those of great draught cannot tack in the channel, unless the wind be favourable; and the must have a pilot.

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* This bank was not examined by Admiral Roussin, but it is fully shown by Captain Hewett, in our chart of this coast. It was surveyed by Captain de Montravel, of the French Marine, as shown hereafter.

† Captain Wellesley has noted two spots for anchorage; the first in 16 fathoms, with the fort S.E., and that of St. Mark E.N.E.; the second, with Fort Antonio E. ¼ S., and Fort St. Mark N.E. by E. These marks show the extremities of the good ground; the second station is recommended as the best. The *Sapphire* never lost an anchor; while vessels near her commonly did.

The least depth found on the bar of St. Luis, in 1820, was 11 feet at the lowest ebbs, and nearly 27 feet at high water; but from a subsequent examination it appears that there is now less, and that the channel is growing up. The mud bank on the South side of the channel is partly dry at half tide.

Those vessels whose draught will not allow them to enter the harbour of St. Luis, and which may require some repair, may find a tranquil anchorage in the little bay or cove of *Ataki*, to the S.W. of Maranham, having a bottom of mud or ooze, with 15 or 16 fathoms of water; the current less rapid than before St. Luis, and the sea always smooth. After doubling the Isle Medo on the West the distance to it is 1 or 2 miles.

Directions for Maranham, by Captain L. Tardy de Montravel, of the French Marine, 1847.

The Bay of San José, though filled with shoals, offers nevertheless a channel between the Island of Santa Anna and the continent, which leads to the anchorage of San Luis, going round the South side of the Isle of Maranham. But this channel is of most difficult navigation, and is very seldom taken by any vessels, and then only because, by entering the Bay of St. José by mistake, or driven there by the force of the currents, they are obliged to continue so dangerous a route. As the flood tide runs rapidly to the S.W., to the mouth of the bay, it is prudent, on leaving the beach of Mangues Verdes in order to pass well to the North of the breakers of Santa Anna to avoid their influence, to go further northward in the track. The banks of Santa Anna being very steep, they can always be passed safely at a short distance, taking care to avoid the effects of the flood tide, which is estimated here to run 2½ and 3 miles an hour. If there should be a slight breeze, and you pass too close to the reefs, you may be driven on them, or else into the West part of the Bay of San José, and find yourself in a very critical situation.

Coroa Grande.—Supposing, then, that you pass 3 miles to the North of these banks, when on the meridian of the lighthouse, you will steer W. ¼ N. to pass some miles to the North of the extreme point of the Great Bank of Coroa Grande, which extends 12½ miles northward of the North point of the Island of Maranham. This bank is formed of several flats, of which the three principal generally, but do not always, break. The corvette *La Bergère*, which anchored for two days on this bank, observed that it always broke while the ebb lasted, and that the three principal groups did not show during the second half of the flood. It has been said that there are some channels across the Coroa Grande, and between it and the coast of Maranham, but the navigation of *La Bergère* proves positively that they are scarcely navigable.

When, after having left the meridian of Santa Anna, you have run 26 miles on the track I have mentioned (in which route the force of the currents ought to be taken into account, the mean rate of which may be taken as 2½ miles, the flood running S. 56° W., and the ebb N.E.), you will be through the northern groups of the Coroa Grande, the breakers on which will have been seen if the state of the sea allows it.

Morro Itacolumi.—You will then steer West and make the Morro Itacolumi, before described. On this point is the lighthouse, which was much required; but as the Morro was sufficiently firm for such an erection, it was therefore built on the cliff itself, 1,090 yards E. ¾ S. from the Morro; the light revolving alternately red and white. I have often heard complaints from captains of the careless way in which the lights on Itacolumi and Santa Anna were managed; but as for myself, during the time that I was employed in sounding the Bay of San Marcos, I did not observe any neglect in this important service. It is as well, however, to be on your guard.

In fine weather the Morro Itacolumi may be seen 18 or 20 miles off, like a small

conical islet on the horizon, and will continue so between East and West, to the distance of nearly 10 miles.

Point Tatinga.—Then steer S. by E., so as to bring Point Tatinga, the extreme land in sight to the S.W., to bear S.W. ½ S. With this bearing on, run S.S.W., so as to bring the same Point Tatinga to bear S.W. by W., and then run for Fort San Marcos, which you will see on the horizon like a small hill, bearing S. ½ W.

Coroa Peixada.—In the route we have described you will have constantly had a depth of 15 to 18 fathoms, except in one part, about 13 miles West of the Morro Itacolumi, where there is a bank, on which 3½ and 4½ fathoms will be found, known to the pilots by the name of the *Paxo*, or *Coroa de Peixada* (Fishing Bank). It extends about 2 miles N.E. and S.W., with regular declivity, though the East and West sides are steep. It offers no danger to a vessel drawing less than 16 feet, but will be a good means of ascertaining your position on the parallel of Itacolumi. Having made this bank, and proceeding southward, you will bring Point Tatinga to bear S.W. ½ S.

Coroa das Almas, Bank do Meio.—In following the previous route you will have left to starboard the *Coroa das Almas*, and the great flat of unequal depth which runs off the shore, and which, bearing to the South to Point Pirarema, follows in an irregular curve the N.N.W. direction of the land as far as the parallel of Itacolumi. To the left hand you will have passed along the Bank do Meio, mentioned by Admiral Roussin, which lies in the middle of the Bay of San Marcos, and is 6 miles in length, S.S.W. to N.N.E., with a mean breadth of half a mile.

It chiefly consists of fine grey sand, very light, and marked with black specks, into which the anchors penetrate deeply. When at the South extreme of the Bank do Meio, Point Tatinga will be on with the centre of the Isle Livramento, bearing W. by S. ¾ S.; Fort San Marcos, S.S.W. ¼ W.; and the white patch of Pirarema, W. ½ N. From the extreme North end Point Tatinga will bear S.W. by W.; Point Pirarema, W.S.W.; and Itacolumi, N.W. by W. ¾ W.; but from this point it will not be possible to see the land distinctly, unless the weather is very favourable.

The soundings vary on this bank from 13 feet to 6 fathoms at low water. Its western side is steep-to, so that the lead affords no indication of your approach, and at the same time the great distance of the land renders this still more uncertain. The Coroa das Almas, which forms the other side of the channel, has the same difficulty in distinguishing by the lead.

The only directions that can be given for avoiding both these banks is to keep the highest part of Point Pirarema within the angle between the bearings of S.W. ¾ S. and S.W. by W. For its south-western extreme you will go clear of it by keeping between the coast and the Morro of San Marcos on the bearing of S.S.W.

Bayadère Passage.—Having well recognised the breakers of the Coroa Grande, and you wish to run to the anchorage of San Luis de Maranham, passing on the eastern side of the Bank do Meio, you must follow the directions given by Admiral Roussin, previously described.

Outer Anchorage.—When, by either of these routes, you have come within 2 miles to the North of Fort San Marcos, you should wait for a pilot if you wish to enter the port of San Luis. If you mean to anchor outside, you must steer on the middle of the *Boqueirao*, a channel formed by the Isle do Medo and the Islet Espera, and you must anchor when you bring the Fort San Antonio, which is raised at the entrance of the port on a sandy point called Ponta das Areias, to bear S.E. by E. ¾ E.

By keeping the Boqueirao open you may be certain that you are to the eastward of the Bank da Cerca.

Interior Anchorage.—I would not advise any captain who has not been frequently in this port to bring in his vessel without having previously taken a pilot at the bar.

If, nevertheless, it is indispensable that he should enter at once, these are the directions to follow:—At low water the banks are sufficiently uncovered to show the passage perfectly; but it is not so at high water. You must then steer so as to pass a short distance from Ponta das Areias. When you have opened Point San Francisco, and the eastern angle of the barracks, nearly a sail's breadth, bear round quickly to port, and then run on so as to pass at a cable's length or more to the South of Fort San Antonio, whence you may bear up for the city, keeping to the windward side. It would be as well, when you are abreast of Point San Francisco, to bear off a little so as to avoid a point which projects from it under water.

Point das Areias and Bank da Minerva.—The two only points to dread are these, which form the South point of the entrance of the port. To ground on either of them is dangerous, for the sea sometimes breaks on them very heavily, but all over the port, to run aground only occasions loss of time and trouble.

The anchorage before Fort San Antonio is the most commodious on account of its proximity to the port, but the sea is frequently heavy in the season of strong breezes; and the bottom being of madrepore, covered with a bed of sand, the loss of anchors is also to be guarded against.

Anchorage to the South of the Isle do Medo.—The anchorage which is best adapted for vessels with a large draught of water, and which have to make some stay at Maranham, is that to the South of the Isle do Medo. There will be found at that part a depth of 11 fathoms, with a bottom of sand and mud, and always sheltered from the sea. It is still better at the back of Point Ataki; but that to the South of the Isle do Medo has every security, and at the same time has the advantage of being nearer the port.

The track to this anchorage is to steer so as to pass to the West of the Bank da Cerca, and to go round the Isle do Medo to westward, so as to come to the anchorage on the South. A glance at the plan will show better than any directions how readily this anchorage is arrived at.

Tides.—The tides are regular in the port of Maranham, and throughout the bay. The directions of the currents vary a little in different parts; at the anchorage of La Bayadère the flood runs S.S.W., and the ebb N.N.E. South of the Bank do Meiro they run, the one to the S.W., and the other to N.E. The maximum rate, 1 4-5th miles in ordinary tides, and 2¼ miles at spring tides. The rise and fall is 11 feet in ordinary, and 17 feet 9 inches at spring tides, according to the "Pilote de Brésil," at the entrance of the port. At the custom-house quay, within the port, we have found the ordinary rise and fall 10 ft. 9 in., and 16 ft. 5 in. at spring tides. The time of high water (establishment of the port) is 7 hours. The position of the West bastion of the sea battery is lat. 2° 31′ 45″.7 S., long. 44° 15′ 44″ W. The variation of the compass, observed at Point San Francisco, on the 9th of March, 1845, was found to be 0° 28′ W. In January, 1820, at Fort San Antonio, it was 1° 37′ E.

Directions for leaving the Bay of Maranham.—Supposing a large ship wishes to leave the Bay of San Marcos, and she is moored before the entrance of the port with the wind from between E.N.E. and E.S.E., she will get under weigh at high water, and steer W.N.W., to pass to the South of the Bank da Cerca, which will be passed when the little islet to the N.E. of the Isle do Medo lies to the East of the easternmost of the two Espera Isles. The lead will be a sufficient guide. Then bear up as close as possible to the wind, and run on until you are about 2 miles from the shore of the continent.

So long as you are to the South of the white patch of Pirarema bearing W. ¼ N., you may tack from one side of the bay to the other without fear of the Bank do Meio; but, when to the North of this bearing, you must keep within the following limits:—To avoid the Bank do Meio, you must, while to the South of the high lands of Point Pirarema, keep to the West of the bearing of Fort San Marcos to the S.S.W. ¼ W., and when you have passed to the North of the parallel of the same high lands of Pirarema, you must keep to the West of the bearing of Point Tatinga at S.W. by W. The Coroa das Almas and the Bank of Pirajuba are cleared by keeping eastward of the line of Point Tatinga on with Point Raymondo, bearing S.W. ¾ S. These banks being too steep for the lead to give any indication on approaching them, it will be prudent to keep within the above bearings.

Leaving the port at high water thus, a vessel, though of large draughf, can keep on the port tack without fearing the Bank da Cerca, on which there will be a depth of 20 feet at high water. A small vessel also, at any hour of the tide, need take no notice of the Bank do Meio, as there is never less than 13 feet on it at low water; and from thence you may tack from one side of the bay to the other, that is to say, from the Banks of Coroa Grande to those of the Almas; but as the ebb will be stronger on the western side of the bay, it will be better to tack in that part of it. It is for this latter reason that the pilots prefer the western passage for large ships on leaving to the eastern, in which, nevertheless, the lead is a better guide than in the first.

I would advise a vessel which, leaving too late or hindered by any cause, cannot get out in a single tide, to take the eastern channel in preference, in order to choose an anchorage at the end of the ebb tide. The sea there is quieter, and the bottom better than in the western channel.

A vessel which has but a short time to stay in the Bay of San Marcos will do well to stop at the anchorage called, by those who frequent the bay, the *Road das Alagoas*, to the N.E. of Fort San Marcos; there will be found an excellent bottom in 10 and 11 fathoms water, and the sea quiet.

A vessel brought to the parallel of the Morro Itacolumi is considered as being out of the bay, and is then left by the pilot.

DIRECTIONS GENERALLY FOR PROCEEDING TO MARANHAM, ETC. BY CAPTAIN THE HON. WM. WELLESLEY.

The best landfall for vessels from sea is the *Lancoes Grandes*, between long. 42° 45′ and 43° 12′, the whiteness of which, *already described*, is remarkable. Crossing the Equator in long. 40° 40′, the true course to this coast (*not allowing for current*) will be S.W. Run boldly to the western extremity, and you will thence make the green or verdant land about *Mangues Point*, with the lighthouse on St. Anne's Island, &c.

In proceeding for Maranham it may be supposed that the land is made in the morning about the Lançoes Grandes. You will be running down to near the land, probably on a S. by W. course. Having seen it clearly, haul off to W.N.W., and, having arrived at their termination, you will run about 10 or 14 miles along the coast, nearly quite green, the "Mangues Verdes." From the mast-head St. Anne's lighthouse will be in sight as you run along, bearing perhaps about S.W. by S. It will be seen before the island on which it stands, and makes like a vessel under sail. You are not sure of making the island itself, until Mangues Verdes, or Green Mangrove Point, bears S. by W.; and it essential to bear in mind that the lighthouse is not on the northern extremity of the island. The dangerous shoals which run in a N.E. direction of it will now be made out; and, if you think the flood is setting you in, haul off in time to N.W. by W.

Having brought the reefs of Sta. Anna's Island abaft the beam, a W. ½ N. course may be steered with safety until the *Coroa Grande* breakers are passed. A N.W. by W. course has been recommended, but the *Sapphire* steered W. ½ N. on the flood, in perfect safety, making the two breakers; but steering the same course upon the ebb, she was obliged to keep away W.S.W. to make them.

GENERAL REMARKS ON QUITTING MARANHAM, AND RETURNING TOWARD EUROPE.

It has been already noticed that on the northern coast of Brasil, in general, there is no difficulty in proceeding along it with the prevailing winds. During five-sixths of the year these winds blow from E.S.E. to E.N.E., and it is easy to proceed to the North, and even to gain a little to the East, by governing the starboard tacks.

In quitting the port of Maranham, and proceeding thence northward, a favourable wind is required, and care must be taken in order to avoid the dangerous shoal of *Manoel Luis*, described hereafter, and which lies as now represented on the chart. The combination of tide and current hereabout render it necessary to be very circumspect when leaving the bay, or in sailing between it and the shoal of Manoel Luis, as the stream may be very variable.

In supposing the winds to be to the East, N.E., or S.S.E., which are the most frequent, you must take the starboard tack on quitting the roads, and then endeavour to steer so as to make good the route of N. ½ W.

It is requisite to get under weigh at the precise moment of high water; so that the first stretch or tack may carry you clear of the Cerca Bank, an approach to which may be known by a sudden change of depth, from 15 or 16 fathoms to 8 and even 5 fathoms, in the interval of time required for heaving out and drawing in the lead.

The *Cerca Bank*, situate in a N.E. and S.W. direction, is narrow. When on the northern extremity, in 9 feet at low water, the eastern side of the northern islet *Espera* appears in a line with Point Ataki, and the Point of St. Mark S. 56° E.

Beyond this, the first tack toward the West may continue, according to the wind and the tide; the ebb being still favourable. The latter sets, as already noticed, to the North and N.N.E. in all the extent of the bay, and one ebb may suffice for carrying the vessel out, provided it be taken, as before recommended, from the moment of high water.

Small vessels may approach the coast, on the West, to the distance of 2 or 3 miles, but it is not prudent to advance so near in a larger vessel, or in less than 12 fathoms.

Having completed the tack to the depth prescribed, and hauled to the eastward, the depths will be found to increase, and it is probable that the second tack to the North will accomplish the passage outward; but, should it be otherwise, you continue to tack while the ebb continues; never lessening the depth under 12 fathoms, and taking every precaution not to approach too near the *Middle Bank*, which is steep-to. The velocity of the stream will be found proportionate to the depths; and the middle of the channel being deeper than the sides, it is consequently in mid-channel that the tide is most favourable.

Should the winds blow from the S.E. or S.W. quarters at the moment of departure, with an appearance of duration, the most convenient route will be made along the Maranham side and the bank of Coronha Grande; but the channel to the eastward of the Middle Bank requires caution. The leading mark to clear the eastern side of this bank is the tower of St. Marcos S.S.W. ½ W., until the Morro or Mount Itacolumi bears N.W. by W. ¼ W., where you will be clear of its North end, and may proceed according to circumstances.

The pilot employed in conducting vessels outward is generally discharged at 2 or 3 leagues to the eastward of Mount Itacolumi.*

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* For a knowledge of the bank of soundings off the Bay of Maranham, the naval world is most especially indebted to a small but valuable chart, constructed by Lieut. G. Crichton, R.N., in 1813. Its contents, with a corrected longitude, appear on the chart which accompanies these Directions, and render a more particular description superfluous. It may be seen that white sand, with black specks, is predominant all the way from below the parallel of Itacolumi, or 2° 15′ S. to beyond that of St. John's Island, or 1° 6′ S.

On the eastern part of the bank, upon coming from the eastward, the soundings are found more variable. Here are coarse sand, with bits of coral or pounded madrepores, broken shells, gravel, &c., all of which correspond with subsequent descriptions.

The only obstacle now to be feared and avoided, on the route to the northward, is the shoal of Manoel Luis, of which a description is subjoined.

SHOAL OF MANOEL LUIS.—This dangerous shoal, which lies in the *true* direction of N. 80° E., 77 miles from the Point of Itacolumi, was first explored by M. Roussin, who ascertained its position in 1820. It was previously known only by the number of wrecks which it had occasioned, and M. Roussin found it to consist in several groups of conical rocks even with the water, and separated by intervals unequal both in distance and in depth. Situate in a sea rarely exposed to violent winds, this reef breaks only in short intervals and at low water. It is therefore almost impossible to see it, unless when passing very near. Nevertheless, several rocks of the flat have over them not more than from 5 to 15 feet of water, with 8, 10, and 12 fathoms at their base.

The breakers, which rise instantaneously, have the appearance of the spouting of a whale, while the sea is smooth about them; and, when they cease, they leave masses of white foam, which continue for some time. When the sky is serene, the rocks may be seen under water, appearing like great black patches; but these are not visible until too near to be prudent for a vessel to advance to them. After two hours' flood, and only at half a mile off, with the sea smooth, no trace of them will be seen.

M. Roussin examined the shoal on the East, the South, and the West: and he pronounces that there can be no other danger hereabout, in these directions; but circumstances did not allow him to complete an examination from the North.

M. Roussin's observations, at 400 toises to the South of the westernmost rocks, gave for the lat. 0° 51′ 25″ S., long. 44° 14′ 35″ W. Variation, 0° 57′ E.

The reef, which lies 0° 1′ 30″ East of St. Luis of Maranham, is more than half a mile across from North to South, and about 3 miles in an E. by S. and W. by N. direction. Should a vessel strike upon it she would, most probably, go down immediately; as was the case with the *Venus*, of Liverpool, on the 21st of May, 1814, which ship unfortunately experienced this misfortune, and disappeared in about twelve minutes. The utmost precaution, therefore, is necessary, in order to avoid this danger.

By anchoring for thirty hours near the edge of the shoal, it was found that the tide set regularly six hours each day, the flood to the S.W., and ebb to the N.E., nearly with the same strength, six-tenths of a mile per hour. High water, on full and change, at 5^{h}. The rise and fall was 12 feet. These remarks have been confirmed by others made by Lieutenant Lartigue, in a vessel called the *Lyonnaise*, in 1826, who found the alternate streams to run at the rate of nearly a mile in the hour.

The shoal of Manoel Luis was again examined on the 8th of December, 1828, by Captain Geo. Cheveley, during a fine steady breeze, nearly East, and clear weather. This gentleman has said:—The appearance of the reef, on approaching, is only that of a heavy sea, or rollers, hardly breaking in calm weather, and consequently the more dangerous. It is very steep, rugged, and composed chiefly of detached coral rocks. The shoalest part appears to have about 6 feet of water over it, the sea breaking, as it were, through gaps or little channels under water. The extent seemed to be about 1¼ mile from East to West, and from half to three-quarters of a mile North and South. Lat. 0° 52′ 10″ S., long. by chronometer (Jackson, of Liverpool), 44° 12′ 17″; by another (Hornby, of Liverpool), 44° 12′ 40″; lunars, 40° 12′ 6″. The accordance of these results with those of M. Roussin leaves us no doubt as to the situation of the shoal.

There is perhaps another shoal to add to the previous, lying 50 miles N.W. by N., from the vigia of which the position is given in the journal of Capt. Le Huby, of the brig *Les Jumeaux*, as follows:—I had left Maranham on October 3rd, 1838, at 2^{h} a.m., to proceed to Guadaloupe; the 1st of November, at 7^{h} 30^{m}, the wind at East, slight breeze, fine weather, I perceived ahead a remarkable change in the water, which had become whitish or greenish, with a very short sea, which seemed to raise and break in the direction of our track, which was then N. by W. We were surrounded by these rollers, and large patches under the water made me think that I was over some shoal, and gave me some inquietude as to our position. At 8h I sounded in 17 fathoms water, rocky bottom, continuing our route in the same direction, and under the same circumstances, the ship going 2 knots. I sounded at 9h in 19 fathoms, bottom of coral; at 10h I found similar bottom with 21 fathoms; at 11h I had 26 fathoms, same bottom; at 20 minutes after noon observed the latitude, the depth was 29 fathoms; at 10h I sounded without finding bottom at 85 fathoms, the sea had become quiet, and had attained its natural colour.

A good meridian altitude at noon gave lat. 0° 4′ N. The longitude by a good chronometer was 44° 44′. It results from these observations that the shoal I had passed extends from lat. 0° 9′ S. to 0° 4′ N. in a S. by E. and N. by W. direction. From my observations in this part the sea is much agitated, and breaks at intervals in the direction of N.W. and S.E. I think that it may be a part of the vigia of Manoel Luis, and the breakers seen by Da Sylva. Without being able to assert that it may be shoal enough for a vessel to ground on in parts, I think that it is dangerous to cross it in bad weather, on account of the heavy sea which you may meet with.*

VIGIA of M. DA SYLVA.—M. Roussin says that, in 1825, he was apprized of the existence of a group of rocks, said to have been discovered by M. Da Sylva, an officer of the Brasilian Marine, and he enters largely into the question whether they may not be those of Manoel Luis. The position assigned to the Vigia of M. Da Sylva is 0° 32′ S., and 44° 17′ W., and it consequently lies, according to this account, 7 leagues to the northward of that of Manoel Luis. But we find that this Vigia of M. Da Sylva has been laid down, in the same parallel, *at a degree further to the West;* upon what authority we know not; and confess, with sorrow, that we have not more information on the subject.

MARANHAM TO PARA'.

PARA', or GRAND PARA', is the northernmost province of Brasil, and is celebrated for its cotton, sugar, indiarubber, vanilla, chocolate, and coffee. The climate here is very sultry; the woods abound with valuable timber, of great solidity and beauty, and trees that yield odorous balsams.

"This immense extent of land," says Baena, "is agreeable to live in, fertile, covered by a luxuriant vegetation, which is gifted with many rare varieties, and by majestic forests composed of splendid trees, and proper for domestic and naval uses. It contains extensive lakes, towering mountains, and vast valleys. The number of large rivers it encloses is astonishing.

The land is, almost without exception, of the most fertile description, and particularly so in the neighbourhood of the rivers and on their numerous islands, where the soil consists of successive alluvial deposits from 4 to 8 feet deep.

The voyage from Maranham to Para was formerly performed by canoes coasting round not less than thirty-two bays, some of them so broad, that the opposite land is frequently invisible. At present the voyage is performed in a steamboat in from two to three days. The coast is uniformly low, and much intersected with bays and lagoons. The southern mouth of the Amazon is usually called the Para River. The entrance is intricate, and by no means safe, as there are no permanent landmarks. It lies between the two dangerous shoals of Tigioca and Braganza. Vessels have been frequently wrecked on these; and the crews have sometimes all perished. In descending the river there is little danger. If the weather is clear, the breakers on the Tigioca and Braganza banks are seen as the tide flows upwards; after entering this mouth of the Amazon the conflict of the ascending and descending waters is called by its aboriginal name, *pororoca*, and characterises the navigation for some hundreds of miles. No sailing vessel can descend the river while the tide is rushing up from the ocean; and both in ascending and descending distances are measured and regulated by tides. Para is said to be three tides from the ocean, and a vessel entering with the flood must anchor during two ebb tides before reaching the city. Canoes and small vessels, to avoid any danger from the *pororoca*, generally lay-to in certain places called *esperas*, or resting-places, where the water is little agitated. Most of the vessels used in the Amazon are constructed with reference to its tidal navigation; that is, for floating with the stream rather than for sailing before the wind, although sails may often be serviceable.

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* Although we have given this extract, it will be seen by reference to our chart that Captain W. Hewett, in H.M.S. *Inconstant*, passed over this tract in 1814, and found the same depths as here enumerated, and as given on the chart.

The regular ebb and flow of the tides in the Amazon are observed as far as the confluence of the Madeira, 600 miles above the mouth. The *pororoca* is much more turbulent on the northern side of the Island of Marajo, where the mouth is broader and the current more shallow.

In the following description of the coasts between Maranham and Para, we have availed ourselves of the work of M. Tardy de Montravel, of the French Marine,* the surveyor of this portion of the Brasilian coast, to which we have alluded, and also to that of M. Ch. Ph. de Kerhallet.† From these observations and surveys we have also corrected our charts, by referring to which these directions will be better understood.

BAY of CUMA.—We have seen that the western shore of the Bay of Maranham runs to the N.N.W. from Point Tatinga to Morro Itacolumi; at the foot of this mount it turns sharply round to the West, and forms, by a deep indentation of the coast, the great Bay of Cuma, of which the North point is terminated by a low and wooded island called *Isla dos Atins*. This bay, encumbered with shoals, has at its mouth a small island called *Ilha dos Ovos* or *Turuoca*, which offers, I have been assured, good anchorage; but the channel leading to it is shallow, and of difficult navigation. Several rivers, of which the principal is the *Guimarens*, discharge themselves into the bay, and cause, throughout its extent, a strong tidal current; the flood running W.S.W., and the ebb E.N.E., influenced by the East and West direction of the bay.

At 3 miles N. by W. from the Isle dos Atins is that of *Tucunanduba*, forming, with *Tru Island*, which immediately follows it, the *Bay of Tucunanduba*. After Tru Island comes *Point Caouca*, where the coast, running to the West, forms the *Bay of Cabello da Velha*, at the North point of which is the *Isle Mangas*.

This bay is deep, and receives, like that of Cuma, many streams; it affords anchorage to small vessels, and a channel on the North side; but, like all those on the continent, it is of difficult navigation.

Between the Isle Mangas and *Point Tury* you meet with the islands of *Joao-Sinho*, *Gajirutiva*, and *Carapatitiva;* then comes the *Bay of Turyrana*, bounded on the North by the groups of the Isles of San Joao, which separate from that of Turyassu. The former is encumbered with shoals, and is considered as closed to navigation for vessels of any size.

ISLES of SAN JOAO.—These islands are low, like the islands and coast which precede them. They have on their N.E. side some sandy downs, by means of which you cannot fail of recognizing them. The easternmost of the group is detached, and has not any vegetation up to its summit, which is rather high compared with the neighbouring lands. The white sand, of which it is entirely composed, has given to it the name of *Lançoes*. To the E.N.E. of the group of San Joao a sand-bank runs out, on which the sea breaks, and towards the North there is a flat of yellow sand, of very rapid declivity towards the N.W., but gradual and regular to the N.E.

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* "Instructions pour Naviguer sur la Cote Septentrionale du Brésil, par M. L. Tardy de Montravel, Capitaine de Corvette," &c. Annales Maritimes et Coloniales, July, 1847.

† "Instruction pour Remonter la Cote du Brésil depuis San Luiz de Maranhao jusqu' au Para," &c. &c. Par Charles Philippe de Kerhallet, Lieut. de Vaisseau, etc., Ann. Marit. et Col., 1841.

At 45 miles N.E. by E. from these islands is the Bank of Manoel Luiz; the channel between has been sounded partly by Admiral Roussin and partly by M. Lartigue and M. de Montravel. It is quite clear, and sufficiently wide to be navigated with confidence; nevertheless, it was much dreaded for a long time by navigators. Now that the position of the shoal has been exactly determined, all apprehension has disappeared, and vessels leaving Maranham frequent it with perfect security. The breadth of the channel, the close vicinity of the point of departure which can be taken, the passage of yellow sand which the lead shows upon the bank of madrepores, mixed with grey sand, and the progressive increase of depth when you have passed the parallel of the Isles of San Joao, are sufficient reasons to dispel any dread which this passage caused, and which render unnecessary any extended instructions on its navigation.

Bay of Turyassu.*—Limited on the East by the Isles of Jan Joao, and on the West by *Point Tamandua*, the Bay of Turyassu presents an opening of nearly 20 miles in breadth, occupied almost entirely by sand-banks. It affords anchorage in its eastern parts, to the East of the Bank of *Muricitanduba*, an anchorage which is more sheltered the deeper you go in it to the South, or nearer the land. It is prudent, however, not to pass further to the South than S.E. ¼ S. from the mouth of the first river you come to on the western side of the group, and not nearer the land than in 6 fathoms water.

A vessel of small draught requiring repairs, and consequently making a longer stay, can, by passing through the narrow channel which runs by the principal group, come to an anchor between them and the *Isle Jabaroca*, where they will be more sheltered from the sea outside.

POINT TAMENDUA projects more than 7 miles to the N.E., and off it is the extremity of a line of breakers, which continues along the coast at a mean distance of from 5 to 7½ miles, as far as Cape Gurupi, to which it approaches to within nearly 1½ mile. This bank, intercepted by some cuts, which gave access to several intermediate bays, surrounds also the numerous islands which border the coast, and prevent any approach to it.

Near Point Tamandua you may distinguish with difficulty the islet *Motuoca;* then the islands *Acara*, *Maracasumè*, *Pirucaua*, *San Joaosinho*, each of which gives its name to a bay which it divides from its neighbour on the West. The *Bay of Pirucaua* affords an anchorage of difficult access across the banks, which extend far out to the N.E. from the island of that name.

MORRO PIRUCAUA.—The coast offers one landmark, the *Morro of Pirucaua*, an isolated hill, which is the more remarkable as it is the only one you meet with after the Isles of San Joao.

To the West of the Bay of San Joaosinho you find the *Isles dos Irmoens*, and that of *Pria*, separated by *Trumahi Bay*.

From Pria Island to Cape Gurupi the coast recedes, and forms a large bay, with the Islands of *Sumacas*, *Redonda*, *Gurupi*, and *Rasa*, in its opening.

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* "Tury-assu (Great Tury) in the lingoa geral still used among the lower orders and Indians. In Brasil the word *assu* means great, and *mirim* small. The larger portion of the names on the coast belong to the Tapuya language."—*M. de Kerhallet.*

The *River Pria* runs into the eastern part of this large bay, to which it gives its name; the western part takes its name from Cape Gurupi, which bounds it on the West.

CAPE GURUPI is in lat. 0° 54′ 5″ S., long. 46° 11′ 3″ W., and is remarkable from its distance from the adjoining land, and by the sands which lie at its foot, and rise in several points, in patches and cliffs. The neighbouring islands serve equally to make it recognizable; but these are not the only characters which make it the best landfall of all this coast.

The most particular features of Cape Gurupi are three mountains rising in steps, at equal distances from one another, from the coast of the Bay of Gurupi to a distance of 25 miles in the interior. Although of middling height, they are remarkable, because the land preceding it to the East, and that following to the West, are low, and scarcely to be seen at the distance of 14 miles, while, in clear weather, the hills in question are visible at 25 miles off.

BAY OF PRIA UNGA.—To the West of Cape Gurupi is the Bay of Pria Unga, the western point of which is formed by *Manijetuba Island*, and on the South of it there are three islands, by which it may be known. The River Gurupi enters, by a mouth of a mile in breadth, the S.E. part of this bay: it is said to be navigable for small vessels.

The edge of the bank off the coast, which we have said approaches Cape Gurupi, again runs off to the distance of 5 miles from the land at Manijetuba Island, and running at this distance, as far as the Bay of Caité, prevents the bottom of the bays from being distinctly seen.

At 12 miles to the W. by N. from Manijetuba Island is that of *Carauassu*, forming with it *Priatinga Bay*, and with *Point Anajaes* lying nearly 10 miles W. by N., the *Bay of Punya.*

JAPARIGUE ISLANDS.—Punga Bay is distinguished from that of Priatinga by the two islands called Punga, or Japarigue, which can be seen from midway between the two limits of the bay. Divided by a small channel of about a mile broad, and lying in a line parallel to the track in running along the coast, the Japarigue Islands never cover each other, but remain perfectly distinct and separated. This observation is important, inasmuch as they cannot then be confounded with the islands which lie in the middle of the Bay of Caité, which is separated from that of Punta by Point Anajaes.

To the North of Point Manitijuba is a shoal upon which the English steamer *Growler* found three successive soundings of 4½ fathoms in the middle of the deep-water soundings. The position was not fixed with great accuracy, and it has been called *Buckle Bank*, after the commander of the *Growler*.

CAITE′ BAY.—This bay, which is the largest on the coast, receives in its South part the river of the same name. It is remarkable for three small islands which divide it into two nearly equal parts, the outermost of which stands nearly 4 miles North of the bottom of the bay. The last island has on its North side a sandy beach, terminated on the West by a small cliff, by which it may be readily known. These islands cannot otherwise be mistaken for those of Punga, because, as was stated above, the latter always appear well separated, while the former project over each other, and appear as one.

Caité Bay is closed by the great bank which follows the coast as far as Point Motuoca. A cut in the bank leads to an anchorage under the islands, but it is difficult to use, and only practicable for very small vessels.

Manitijuba Island is low and wooded, and forms the West Point of Caité Bay, which divides it from the Bays of *Coati*, *Paru*, and *Miriquiqui*. These have for their common limit a point jutting to the northward, called *Japirica*,* which is distinguished from the surrounding coast by its being rather higher, and by the reddish colour of its extremity; besides this, it is remarkable for appearing, more particularly from E.N.E., as an island rounded at the summit, and well separated from the land.*

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* This point is also called *Falso Carro de Mato*, to distinguish it from the East point of Caité Bay, for which it is sometimes mistaken.—*Lieut. de Kerhallet.*

The West point of Miriquiqui Bay is distinguished by a clump of trees higher than those which cover the neighbouring coasts. It has, seen from some distance to the northward, the appearance of a fortification, and is known to the mariners here under the name of Carro de Mato (the load of bushes), a name which also belongs to the point on which it stands.

In coming from the East you will see, if the weather is clear, some land which is sensibly elevated above that around; this is *Mount Piraussu,* lying nearly 3 miles S. ½ W. from the village of Salinas.

BAY of SALINAS FALSAS.—After the Bay of Miriquiqui comes that of Salinas Falsas, remarkable for the downs of white sand lying at the eastern point of the bay. Seen from sea they show like breakers or ship's sails: one of them in particular, separated from the three principal, and raised above the water, is just like a boat's sail with the sun shining on it.

Soon after having made out these downs you will have no difficulty in seeing the West point of the Bay of Salinas Falsas. It then appears like a small round island, but soon joined to the continent by small hummocks, and forms but one shore with the bottom of the bay. This extreme point, called *Atalaia Point,* is in lat. 0° 33′ 5″ S., long. 47° 16′ 47″ W. At nearly 2 miles from its extremity, which is of a somewhat reddish colour,† it shows a beach and downs of white sand, spotted with patches of verdure, while the thickets, which crown its summit, merge into the trees of the interior. A small hillock of white sand at the East end of the beach is rather remarkable.

Point Atalaia Lighthouse exhibits a fixed light, varied by a flash, visible every two minutes at 17 miles off. It appears as follows:—bright white light during seventy seconds; eclipse or obscurity during sixteen seconds; increased and brilliant flash, diminishing until it disappears, twelve seconds; another eclipse twenty-two seconds. Total period, one hundred and twenty seconds. It was resolved on in 1838, and has been in operation since February 15, 1852.

SALINAS BAY.—Coming from the East, Point Atalaia appears at the end of the coast; but on approaching its meridian you soon discover other land from which the point projects. This is the bottom of Salinas Bay, having at the base a long beach of sand, and some white downs, rather elevated. You will soon see the village of Salinas upon a wooded plain. You will at first only see the church, standing out white on the lands of the second range of hills, but when you are about 6 miles North of the village you can distinguish the red colour of the roofs.

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* "The Bay of Salinas Falsas presents the following resemblance to that of Salinas. First, downs of white sand, principally on their western side. Second, a long beach of very white sand, which produces, at a certain distance, the effect of breakers; and the summit of the coast being covered with trees in both. The principal differences between them are these: First, the Bay of Salinas Falsas is very deep, and you can hardly see the land at the bottom. That of Salinas forms but a slight curvature in a semicircular form, in the middle of which stands the village. Second, Carro di Mato, the eastern point of the one, is peaked, and has a clump of trees on its summit, and appears of a blackish tint at 7 miles off. Atalaia, the East point of the other, is less peaked, and terminates in a long point of sand; at 7 miles off you can discern its reddish tint and its rocky character. It has only some bushes on its summit. Third, after having doubled Point Carro di Mato, you can see some land more to the North than it is, whereas beyond Atalaia the land only forms a long line, without any projections, to the North as far as Point Curucua, and you also then cease to perceive the breakers."—*Kerhallet,* p. 31.

† I would not advise any one, however, to depend too much upon this reddish tinge for making out the point. The downs of Salinas Falsas, and the sandy coast which precede Salinas Falsas, are better points of recognition."—*M. de Montravel.*

M. de Kerhallet says that the reddish tinge is peculiar to Point Atalaia, although it has been attributed to Cape Carro de Mato: "I do not deny entirely that the reddish tinge exists, which M. Guéritault assigns to Point Carro di Mato, which he calls Mount Pirassu, but I have never been near enough to see its whole height, and I can affirm that, at 7 miles off, it does not appear of this colour, and I think it ought not to be approached nearer.

The level land upon which Salinas stands falls gradually to the West, where it terminates in a clump of high trees, which serves to crown it. The land of the second range continues to run to the S.W., more elevated than those preceding to the East; and those which follow to the West form, with Point Atalaia, a point of recognition which cannot fail of being remarked.

To the N. by W. ½ W. of the village is the centre of a shoal, upon which there are but 4 to 4½ fathoms. It is 2¼ miles long from S.S.W. to N.N.E., and 1 4-5ths miles from E. to W. It leaves between it and the land a channel of 2½ miles, in one part of which there is muddy bottom. Some persons have assured us that they have found less than 3 fathoms water on it, but we have never found less than 4. Salinas is the pilot station.

SALINAS BAY TO POINT TIJOCA.—Salinas Bay is bounded on the West by the *Island of Praia Grande*, which separates it from that of Maracuno. This island is remarkable by a very high tree, which crowns it like a tower, and by a sandy beach at its N.E. point. The great bank off the coast, which is close-to at Point Atalaia, commences at the meridian of Salinas to run rapidly to the North to within 2½ miles of the East point of Praia Grande; there it takes a direction parallel with the North coast of the island, and then runs again to the N.W. to 4 miles from the West point of the same island.

You will soon see *Point Marapani*, the western end of *Maracuno Bay*. This point is the North point of *Maranduba Island*, and is distinguished by a little hummock, and sandy beaches and downs, which, although but slightly elevated are easy to recognize, because it is the only point of the coast between Atalaia and the River Para, which has the same aspect. Its recognition is important, because on its meridian is the northernmost point of the bank off the coast. We have seen that it runs to the North from the meridian of the West point of the Island of Praia Grande; thence it runs to the West, turns sharply to the North to 4 miles from Point Marapani, and takes an East and West direction.

From the meridian of Point Marapani you may see the low point which is the North part of *Cajetuba Island*. This forms, with Maranduba Island, the large *Bay of Piracumbaua*, at the bottom of which you may easily distinguish the outline of the island of the same name.

Then comes the *Bay of Cajetuba*, which divides the island of the name from that of *Curuça*, the West point of which, higher than the land we have seen from Salinas hisher, falls sharply to the sea. Particular notice must be taken here of this steepness of Point Curuça, falling abruptly to the water, and not showing any sand at its extremity, to distinguish it well from that of Cajetuba, which is low, and from Tijoca Point, which we shall soon see to the West of Curuça, and which is low, and ends in a large sandy beach. Between these two last points there is a very deep bay, or rather river, bearing the name of Curuça. We shall see hereafter how important it is that we should not mistake *Point Curuça* for any other near it.

At nearly 4 miles from the N.E. point of Curuça Island the edge of the bank bends to the W.S.W., and nears the Point Tijoca, which it rounds at a mile distance.

MOUTH OF THE RIVER PARA'.

POINT TIJOCA, in lat. 0° 34′ 0″ S., long. 47° 51′ 18″ W., forms the eastern point of the estuary of the River Para, of which the western limit is Cape Magoary, the

N.E. point of Marajo Island. This mouth is 33 miles in width, and from the middle of it you cannot see either coast. It is partly filled with shoals, which we will describe before entering the river.

These banks are divided into three principal groups, which I shall designate by the names of the East, the West, and the Central.

The first consists of the Banks of Bragança, Coroa Nova, and Coroa das Gaivotas, without mentioning the great bank along the coast which we have followed as far as Point Tijoca, and which afterwards joins itself to the South of that point to the Bank of Gaivotas.

Bragança Bank.—The northernmost of the group is that of the Bragança, which it is important to make out clearly, as it lies in the usual passage on entering the river. It is not generally dangerous, because the N.W. face breaks at all times of the tide, although we have sometimes with a calm sea looked in vain for the breakers. But I attribute this extraordinary fact to the circumstance of the sun being about to set, and shedding so strong a light on the water as not to allow anything to be seen in the western quarter. The North extremity of the bank is 7 3-5ths miles N. by W. from Point Tijoca; its S.W. point, named Espadarte, is 6¼ miles N.W., and its S.E. point at 3¾ miles to the North. It is composed of different shoals, of which three, according to the local seamen, uncover at spring tides. They say also that there is between them some small channels, in which there remains 9 fathoms at low water; but for the purposes of navigation we must consider this bank as a continuous flat. It is very steep on the West and South sides, and runs out in a flat to the N.E. and East, on which there is from 5 to 6 fathoms, and the edge on the East side is very abrupt, in fact it drops, in the interval between two casts of the lead from 6 to 12 and 11 fathoms. The Bragança Bank is formed of hard sand, lying, according to the pilots, on a bed of hard mud, and they also say that they do not shift.

Coroa Nova, and Channel Dos Poçoens.—The Coroa Nova lies to the S.S.W. of the Bragança Bank, and is divided from it by a deep channel of a mile in breadth, which was believed not to be navigable before *La Boulonnaise* explored it. Captain de Montravel has called it the *Channel dos Poçoens*; there is good depth for any ship, and we shall see hereafter the security it affords for entering the river.

The Coroa Nova is a bank of sand of recent formation, and shifting, at least as far as regards its N.E. end. An old negro fisherman, who had lived on the coast for 70 years, told us that its North end formed and disappeared by turns, which we can readily conceive, when we reflect that a current of 5 or 6 miles an hour runs incessantly through the channel into which it extends.

Channel of Cassard.—The bank which we are going to describe is separated from that of Caivotas by a channel as wide, but for navigation much less simple and certain than that of dos Poçoens, as I proved by the navigation of the brig *Le Cassard*,* the name of which I have given to the channel.

As will be seen by the chart, this channel is tortuous, and has a less depth of water in it than the one I have spoken of above.

Bank das Gaivotas.—This is a large flat of sand, uncovering nearly altogether at low water, and reaching to the coast, from which it is separated by a small channel navigable only for boats.

THE POCO.—Between the Bragança Bank and the lands of Curuça and Tijoca there is a wide and very deep channel called Poço (the Well). The current in it is violent, and up to this time it was considered very dangerous, and infallibly lead to the destruction of vessels driven into it by the currents or by mistake. But now that *La Boulonnaise* has discovered the Channel dos Poçoens, these fears will doubtless cease, and the facility of the route for leaving the river will give confidence to those who use it.

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* This 20-gun brig, here spoken of, grounded near this channel in 1837; she cleared, and then immediately dropped anchor in 6 fathoms. She was then carried through the channel by a pilot named Juan, but with great difficulty, and against the advice of the Piloto Mor. —*M. de Kerhallet.*

SANTA ROSA AND KIRIRI BANKS.—The western group of shoals is a combination of the flats which must be considered as united to Cape Magoari, although, in reality, they are separated from it by a channel: but it is so narrow, that it cannot be considered as fit for the purposes of navigation. This collection of dangerous flats, which extend to 14 miles East of Cape Magoari, is known in the vicinity under the collective name of *Santa Rosa*. They are all of sand, and break heavily when there is much sea, but sometimes they do not show.

From the extremity of the Banks of Santa Rosa you can see clearly Point Magoari from the deck of an ordinary vessel. The flood runs to the W.S.W., and the ebb E.N.E.

Among the group the bank of *Coroa Kiriri* is also to be placed, lying W.N.W. ¼ W. from Point Tijoca, and South of the eastern extremity of the Banks of Santa Rosa. This bank, although out of the route of vessels entering or leaving, bounds, to the North, the Bank of Morisoca, of which we shall speak presently. It uncovers, it is said, at low tides, and shows generally at ordinary tides. Anchored off its North point we saw from the mast-head, Point Magoari in full view; although the horizon was hazy, as it generally is in the dry season.

CENTRAL GROUP: TIJOCA, SAN JOAO, ADONIS, AND MONJUI BANKS.—At nearly 2½ miles W.N.W. from the S.W. point of the Bragunça Bank there will be found the South point of three banks, lying on a line, N.N.E. and S.S.W., which, together, take the name of the *Bank of Tijoca*. They are designated, in particular, by the names of Cabeça do Sul, do Meio, and Do Norte (South, Middle, and North heads).

The first lies N.W. ¼ W. from Point Tijoca, and N. ½ W. from the opening between two small low islets which are seen not far distant to the East of last land in sight to the South. There is, it is said, nearly 6 feet water on its highest part, but we did not find less than 2¼ fathoms; but this does not disprove the former statement as we were interrupted in our soundings by the loss of our last anchor.

The *Cabeça do Meio* lies N.N.E. 2¾ miles from the South Cabeça, and has only 9¾ feet water on it. From its centre Point Tijoca bears S.E. by S. The *Cubeça do Norte* is 1¾ miles N.N.E. of the preceding, and bears N.N.W. ¼ W. from Point Tijoca. It has upon it only 7½ feet at low water. These three banks are separated from each other by channels, which we crossed at all times without finding less than 3¾ fathoms; but I should not advise any but a very small vessel to hazard crossing.

The Cabeças of Tijoca are of hard sand, and not of rocks, as is supposed by some; each of these is not more than half a mile in extent, and they show so little, that it was only after two days' search, with the ship itself and two boats, that we were able to find the southern one. Their edges are very steep-to; between two casts it jumps from 11 to 6 fathoms; the next cast you are on the shoal itself.

When the sea is at all agitated by the wind, the currents cause violent overfalls throughout the space occupied by these three little banks, so that it would be thought to be breakers. This effect, taking place upon its margins, indicates their extent; but, as it does not always show in this manner, it is an indication upon which no dependence can be placed.

BANK OF SAN JOAO.—To the West, some degrees North, and at 7 miles from the Cabeça do Sul, you meet with a sandbank, on which is found 3½ fathoms water; it is that of San Joao, which the pilots and others, ignorant of the real situation of the banks, improperly placed to the S.W. of that of Tijoca.

ADONIS BANK.—To the North of San Joao, at 6½ miles, another steep bank is found, on which there is 2½ and 2¾ fathoms. Its highest part is so narrow, that, in crossing it, you can hardly obtain three or four casts to indicate it. It was without doubt on this bank that the brig *Adonis* touched, and unshipped her rudder, and as no other bank answers the description, I have given it this name.

Monjui Bank.—To the N.E. ½ E. of the Adonis Bank there is a bank, which I believe to be the Monjui of the pilots. It extends E.N.E. and W.S.W. for an extent of nearly 5 miles, and a mile broad at its West extremity, diminishing considerably in its East part. There are 5 to 3 fathoms on it.

The three shoals of which we have just spoken do not show. Perhaps they are not the only ones contained in the large area which divides the Bank of Tijoca from those of Santa Rosa; but I believe, from the care which was taken in sounding, that there are no others.

The banks we have now described leave between them different passes, which are are used for entering, or for leaving the river.

We have already mentioned the Pass of Poçoens, which, so recently explored, is not yet frequented.

The Bank of Bragança is separated from that of Tijoca by a deep channel of 2½ miles broad. It bears the name of the *Channel de Dentro.* It is the only one used for entering the river, and notwithstanding the difficulty of beating through so narrow a passage, it is that preferred by vessels leaving which draw above 15 feet water. The great space which separates the Tijoca Bank from those of Santa Rosa, takes the name of the North, or Monjui Channel. It would be much more natural to call it the Western Channel. This channel is generally preferred by vessels drawing under 15 feet water. We will now proceed with the coast.

The coast between Point Tijoca and Belem or Pará.—To the South of Point Tijoca the coast forms a bay, into which debouches the channels or rivers, which cut into numerous islands the land lying to the South of Curuça Bay. This indentation is divided into two parts by the projecting point of Tapari, remarkable by three very large trees, which overtop the surrounding vegetation, and almost appear like hummocks. This point forms, in a manner, the eastern side of the mouth of the River San Gaetano, as the Point Taipu is its western limit. Many secondary streams empty themselves into this channel. From the middle of the Channel de Dentro there will be seen, by the mouth of the River San Gaetano, the two small isles Rasa and Ratos, which will serve presently as a point of recognizance for the Cabeça do Sul of the Tijoca Bank.

The *Gaivotas Bank* extends to Point Taipu. Its South part is also called Coroa de San Gaetano, a name which the pilots sometimes give to the Islands Ratos and Rasa.

The lands off Point Taipu are visible when you are abreast of the North breaker of Bragança; they then seem like a low island; but, as you approach them, they join the coast, and then you see them run off to the S.S.W., having at a distance the appearance of two elevated ridges.

You will soon see to the South of these ridges a large tree, resembling a tower, which rises near to the North point of the Furo de Bareta. This tree it is important to make out, if you wish to enter the pass which leads into the River of Vigia.

Then comes Cape Carmo, which appears to rise into a peak, but the trees, having their basis in the water, alone cause this appearance.

The *River de Vigia* has its mouth closed in a great measure by the bank called Coroa do Correio, which extends from Cape Cormo to the bearing of S.E. and N.W. of the large tree which we mentioned above, at the mouth of the River Bareta. It follows the coast at half a mile off, leaving a channel of that width at its North end, but which contracts, at the entrance of the river, to about 10 cables' length in width.

The Coroa do Correio dries in some parts at spring tides; it is of hard sand, and the sea breaks heavily on it sometimes. It will be seen, however, that it is not to be feared so long as you do not pass to the East of the meridian of Cape Carmo.

COLARES.—This last cape is the N.W. point of the Island of Colares, on which you will soon perceive the village of the same name, situated above a sandy beach, and is sheltered from the sea by a line of rocks which, being quite uncovered at half-tide, form a causeway at 1½ miles from the shore. The land is more elevated than that which has preceded, and the coast runs to the South from the point contiguous to the village, as far as Point Cocal, where it turns sharply to the East. On this portion of the coast are several patches of rock.

BAHIA DO SOL.—Point Cocal forms the North extreme of a wide and deep bay, called Bay do Sol, into which runs, on the North, the river or Furo de Vigia; and to the South, that of San Antonio. It is partly filled with a large flat of sand, which dries in places, and runs North and South from Point Govares to within half a mile of the South side of the bay. When you have passed the parallel of the village of Colares, you will see the South side of the Bay do Sol, which terminates sharply at a right angle, and to the West by *Point Marau.*

POMBAS ISLET.—At nearly half-way between these two points you will see upon the coast a round and wooded islet, which for a long time appears to be part of the surrounding land. This is Pombas Isle. Against it there lies a rocky flat, which extends to nearly a mile North from it, and runs along the coast as far as the East point. This rocky shoal is separated from the sand-bank, previously mentioned, by a narrow channel, which leads to the bottom of the bay. The sea is sometimes very heavy, more particularly with the flood tide, in the mouth of the Bay do Sol.

COAST OF MARAJO ISLAND.—From Cape Majoari the coast of Marajo, washed by the river Para, runs nearly North and South, as far as the parallel of Cape Carmo. Low, and covered with trees, it presents the mouths of a number of rivers, of which the principal is that called *Igarapé Grande.* Its breadth is nearly a mile, and it is affirmed that it is navigable for a great distance in the interior. Nearly all these rivers communicate, either directly or indirectly, with the lagoons which occupy a portion of Marajo Island, and for the most part they are navigable for boats.

At 1½ mile South of the parallel of Cape Carmo you will see the *Village of Joannes* which name is sometimes applied to the island. Here the coast turns sensibly to the S.S.W., but does not change in appearance.

At nearly 5 miles South of Joannes is the *Village of Monsarras,* and 5 miles still further, and close to the coast, is a low island, known by the name of the Ilha da Coroa Grande, lying upon the parallel of Point Cocal.

At this little island commences a great bank of sand, which partly dries, and which, turning to the South at the distance of 2½ miles, extends to the N.E. ¼ N. in a sweep to 6 miles from the coast of Marajo. Here it bends rapidly to the West, leaving between its East point and the South end of the bank of Coroa Secca, lying to the N.E. a very deep channel, 2 miles wide.

COROA SECCA.—The bank of Coroa Secca is 5 miles long from North to South, and nearly 2 miles from East to West. On its South point there was, in 1839, a tuft of trees, which served as a beacon, but since that time they have disappeared, being carried away by the currents, so that it is now only shown by the breakers. The two last banks are very steep on their South and East faces.

COROA MORISOCA.—At 6 miles N. ¼ W. from the North point of the Morisoca Bank, which, taking a curve towards the West, extends as far as the Coroa Kiriri, thus extending 34½ miles in a N.E. by N. direction. The Coroa Morisoca dries in many parts of its extent, and has between these higher portions some channels, through which the boats of the country pass, but they are shallow and uncertain.

The South point of Morisoca is divided from the Coroa Secca by an excellent channel, and very deep in its southern part; the depth of which decreases rapidly from 5½ to 3 fathoms in its North part. This is the channel most generally used by the boats proceeding to the West coast of Marajo.

Thus it is shown that this latter coast, from the parallel of Pombas Island to Cape Magoari, is fronted by a line of banks, leaving between them some navigable passes. They are again divided by a wide and deep channel, which possesses, doubtless, good anchorages, if vessels should be called hither by commerce.

EASTERN SIDE CONTINUED.—Pombas Island and Point Marrau have been described. At half a mile from this lies the little Island of Guaribos, which is low and covered with some bushes. Its shores and the narrow channel separating it from the coast are clear.

The coast runs 5 miles to the S.W. to *Point Chapeo Virado*, where it turns sharply to South, as far as *Point Musqueiro*, where it runs E.S.E., forming, with *Barreiras Isle* farther to the South, the *Bay of San Antonio*.

Between Point Marrau and Point Chapeo Virado you will find at a mile from shore several rocky shoals, which cover at high water, and send out a spit under water which extends to the meridian of Chapeo Virado. This shoal is dangerous, and must be carefully avoided.

In front of San Antonio Bay, and S.W. by W. from Point Musqueiro, there is a small wooded island, rocky on its North side and sandy on its South, called *Tatuoca*. It is the advanced guard to the North of a group of islands which lie along the coast to the South as far as the city of Belem. From this island there runs to the northward, for the distance of 1¼ mile, a rocky bank of unequal depth, and having some heads uncovered at low water.

JETUBA ISLAND, which follows immediately to the South, has also a bank running to the North for 1¼ mile; it is of hard sand, and dries at spring tides.

The Bay of San Antonio is formed of a bank of mud, which extends from Point Musqueiro to that which terminates Barreiras Island on the South, and which is divided from Point Pinheiro by the River Magoari. From this point the coast runs directly South to the city of Belem. At 2 cables' length W.S.W. of the chapel of Pinheiro is a rock of small extent, on which there is but 10¾ feet at low water.

The navigable part of the channel is contracted on one side by the mud bank which runs from the S.E. point of Ilha Nova, and extends 3 miles North of it; and on the other by a rocky point, extending 2 cables' lengths outside the ground, near to the extremity of which there is a circular fort, called *Forte da Barra*. To the North of the fort, 2 cables' distant, is an isolated and sunken rock, which requires attention in passing.

After having passed the Forte da Barra the channel widens, and the small islands which have followed it are replaced by a single one called *Ilha das Onças*, the shores of which are parallel with those of the continent, from which it is 2 miles distant. But this width is only in appearance; for the channel is divided into two parts, each of less than a mile in width, by a mud bank, which springs from *Ilha do Fortin*, and extends to abreast of the South part of the city.

Some time after having passed Point Pinheiro you may see, on the horizon, the principal church towers which crown the city, and other buildings will soon rise into view; and then the North part of the city will be seen at the bottom of the bay, on the South part of which it stands.

The anchorage is in front of the city, between it and the bank which lies in the middle of the channel.

PARA', or the CITY of SANTA MARIA DE BELEM DO GRAO PARA', is situated on an elevated point of land, on the south-eastern bank of the Para river, and 8 miles from the ocean. From the sea it has a very striking and pleasing appearance. The anchorage is good and safe, within an abrupt curve in the channel, which admits vessels of a large draught. The island of Marajo is 20 miles distant, but invisible, from smaller islands intervening.

Lieutenant W. Herndon, U.S.N., who traversed the continent from Callao down the Amazon, in 1851—52, says:—"Para is not fortified either by land or water. The harbour is a fine one. It is made by the long island of Onça in front, and at 2 miles distance, with an abundance of water. There is a good landing place for boats and lighters at the custom-house, and at half-tide at the Stone wharf near it. During his stay they were building a strong sea wall all along the front of the town. This will make a new wide street on the water front, and prevent smuggling. The population of the city proper in 1848, the last census, and probably correct now, was 9,284 free persons, and 4,726 slaves; houses, 2,418; resident foreigners, 784. Para was a remarkably healthy place till February, 1850, when the yellow fever was introduced, and in the next year the small-pox broke out, the two diseases taking off one-fourth of the population. Para, however, is an agreeable place of residence, and has a delightful climate. The growth of vegetation in it is wonderful. The police is excellent, but, except to take up a drunken sailor, it has little to do.

No vessel meeting with an accident should, if avoidable, bear up for Para, as a refitting port, the common articles of ship chandlery only, being procurable; Maranham or the West Indies are much to be preferred.

The cathedral of Para, said by Mr. Kidder and Captain Herndon to be the largest religious edifice in the empire, was commenced in 1720, and completed and consecrated in 1775 by a bishop, attended by the monks, magnates, and people. Like most of the other churches, it is built in the form of a cross.

Captain Montravel says:—"Although this port, the only one in this province, is open to foreign vessels, and frequented by a very considerable number, it offers very few maritime resources. At the same time few ports require more to be provided with cordage, anchors, cables, and chains, which are so quickly destroyed in this climate, and which are so frequently lost.

"Provisions, also, are procured with difficulty, and are of bad quality. The water of the river, good during a portion of the year, becomes unwholesome and dangerous during the months of July, August, and September. Ships are then obliged to provide themselves with this necessary element, by their own means, with infinite trouble and loss of time, by artificial wells, dry at half-tide, in the beach of San Antonio, and destroyed by the following tide. Vessels therefore should not reckon, but with great reserve, upon the resources of this port."

SAILING DIRECTIONS FOR PARA'.

MARANHAM TO PARA'.—In proceeding from Itacolumi, whether to the North or to Para, the route is the same to the Isles of St. Joao. Being 12 miles from Itacolumi you will run N.N.W., and until you come to the meridian of Point Atins you will find deep water. The limit of 8 fathoms will be attained on this parallel. You must always keep in a greater depth than this, and you will have nothing to fear. If you find less, you must bear off from the coast.

It must not be forgotten that the flood tide runs W.S.W. at 2½ miles at spring, or 2 miles at ordinary tides, and at a greater rate nearer the shore; the ebb runs to N.E. at the same rate. Should you be becalmed you must not drift by the flood into less than 6 fathoms; if so, you must anchor. On the track here stated you will constantly find the bottom of white sand.

Having run 60 miles on this direction you will be 14 miles off, and on the parallel of the Isles of San Joao; as you approach them the quality of the bottom changes to yellow sand, mixed with red specks.

If it is during daylight, you will have seen the Islands of San Joao, the largest of which appears as a white triangle, fronted by small hummocks covered with vegetation, which at a distance seem like islands before the sand. They cannot be mistaken for any other part of the coast; and, having made them, you have nothing to fear from the Bank of Manoel Luiz, and can bear to the N.N.W., if going northward or W.N.W., if to Para.

If, after running 60 miles N.N.W. from Itacolumi, the land is not visible, either on account of night or haze, you will know that you are on the flat of San Joao if, having 8 fathoms, you have yellow sand. Continuing the route you will have crossed the flat, when you find a sudden increase of depth from 8 to 16 and 18 fathoms; and a change in the quality of the soundings, which become grey sand, with black specks, and sometimes mixed with broken shells.* Having arrived on this edge, you can run N.N.W. without danger; and, if bound to Para, for the sake of security run some miles further N.N.W.; then bear round W.N.W.; and if it is night, keep between the depths of 10 and 13 fathoms; but by day you can approach the coast, and keep it in sight in 8 fathoms. To this depth the soundings decrease regularly, but below this they are irregular.

By daylight, in crossing the Bay of Pirucaua in 8 and 10 fathoms, you may see the Morro Pirucaua, and keeping on in the same depth, you will cross the Bay of Pria, which may be known by the Sumacas Islands, if you cannot see the three hills at the bottom of Gurupi Bay. Between the San Joao Islands and Cape Gurupi the bottom is always of grey sand, with black specks; but on the meridian of this cape you will find the bottom of very fine black sand, the only bottom of the kind on the coast, and which serves the pilots to fix their longitude. Very soon after, the bottom again becomes grey sand and black specks.

Having again certified your situation, you keep on in the same bearing and depth till you make the northernmost island of the Caite group, previously described, and may be known by that description. The lead will also indicate the meridian of Caite Bay; for across the bay the bottom is grey sand and broken shells; sometimes the lead only shows the prints of large shells, of which the bottom is full. Across the middle of the bay is a line of mud, lying S.S.W. and N.N.E. You ought to keep in 10 fathoms here, which will be 8 miles off the coast.

The bearing of W. ½ N. will then bring you up to Point Carro do Mato; then the sandy downs of Salinas Falsas Bay; and, at last, Point Atalaia, which you may approach without danger, so that you keep in 8 fathoms and 3 miles off.

The tides in all this coast are felt at 20 miles off; near the land, where they are strongest, the flood runs into the bays, that is, to S.S.W., at the rate of 1½ and 2 miles; the ebb to E.N.E. at three-quarters to 1 mile an hour.

POINT ATALAIA TO PARA'.—When you have well made out Point Atalaia (now distinguished by the lighthouse), you may approach it within less than 3 miles and more than 2 miles, if you pass within the sand-bank lying N.N.W. of the point. You will have made out Salinas before reaching the meridian of Point Atalaia. If you mean to go outside this flat, as is most prudent for a large vessel to do, you must not come nearer than within 6 miles of the point, and than in 11 fathoms.

A vessel wanting a pilot for the river can cast anchor in the muddy channel inside the shoal, having Point Atalaia bearing S.S.E. ½ E., and the village S.S.W. ½ W., where you have less chance of losing your anchor than outside in 11 fathoms.

I would advise every vessel to wait for the pilot under sail, whichever way the wind may be; you can always keep the village in sight, by tacking so as to neutralize the effect of the currents, which you can also do under shortened sail.†

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* Lieutenant de Kerhallet says:—"Black gravel, mixed with small shells, the only soundings of the sort on the coast," p. 18.

† If it is necessary to send a boat ashore for the pilot, it should leave the ship so as to

The pilot signals, as published by authority, in February, 1843, are as follow :—*

1st. Every vessel arriving off Salinas, either foreign or native, will hoist a *red flag*, on any part of the rigging, so that it may be seen from the land, with the exception of the peak or the gaft end of the mizen.

2nd. At Salinas, or the pilot station, there will always be hoisted, during the day, a *white flag*, which only serves to indicate the residence of the pilots there.

3rd. The same white flag, accompanied by a *red* one, with a white square in the middle, hoisted on either the right or left side, is to say that there is a pilot on the station, and that he has a boat.

4th. After this signal there will follow the one to indicate to the vessel the time the pilot can go off, and for this reason the persons on board ought to pay the greatest attention; therefore, if from the shore a white *burgee* (or *pendant*) *with red cross* is hoisted, it is indicated that the vessel must await the pilot, who will go off immediately; but if, instead of the white pendant with red cross, a *red one* be hoisted, it is to inform the vessel that it is not a proper time to go off, but that the vessel must be kept under easy sail, or lay-to at sea with the ebb, and inshore with the flood tide, so as to be near the shore at high water, which the masters must bear in mind takes place at 1^h 30^m or 2^h at new moon, and at full; inshore at 7^h 30^m to 8^h a.m., and at 7^h 30^m to 8^h p.m.; at the quarters of the moon, at 12^h to 12^h 30^m in the day, and the same at night; and it is only at high water that the pilot can go off.

5th. If the signals are made before mid-day, and if, after the signal for waiting is made, *two pendants* are hoisted, red above and white with red cross below, it is to inform the vessel that the pilot will go off before 12^h. If the white pendant with red cross is above, and the red underneath, he can only go off after 12^h.

6th. If the signals are made in the afternoon, the red flag intimates that the pilot will go off before midnight; if the white flag with red cross is hoisted, after midnight. Respecting the fires that were lit at night to indicate that there was a pilot but no boat, and that there was neither, this practice is annulled, in consequence of the vessel that is now getting ready, and to be constantly kept at the orders of the pilots at Salinas.

After having embarked the pilot, if you are in less than 11 fathoms, keep to the N.W. until you are in this depth, and keep so by going W. by N., which will carry you along the coast 5 miles off, as far as Point Cajetuba; when the land bears away to the South. On this bank there is nothing to fear as far as the meridian of *Point Curuça*, the importance of which we have previously shown.

ROUTES FOR ENTERING THE RIVER BY THE PASSAGE DE DENTRO.

1st. *When the breakers on the Bragança Bank are seen.*—Having arrived in the meridian of Point Curuca, and only then, you will see to the W.S.W. ½ W., the breakers on the Bragança Bank, 7 miles off. A bearing taken now of the East point of Cajetuba, and of the West point of Tijoca, which you will see to the S.W. ½ S., with its characteristic sands, will fix the position of the vessel, and also show the previous effects of currents. If your course hitherto has been with a proper allowance for them, you may safely continue it, without danger from the flat extending

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be at the mouth of the little river, on the West side of which stands the village of Salinas, with two-thirds of the flood. The sea breaks heavily on the bar, and there is great danger in attempting it at any other time of the tide; she should not attempt to leave after the first third of the ebb tide.

* In the "Nautical Magazine" these are erroneously given as Directions for Maranham.

E.N.E. from the Bragança, until you bring the sandy point of Tijoca to the S. ½ E. Then follow round the breakers, leaving them a mile eastward, until you bring the southernmost (called Espadarte), on with Point Tijoca, bearing S.E. Then place the vessel's head to S.W. ½ S., and this will carry you in 12 and 10 fathoms in the channel to 10, 7, and 6 fathoms.

2nd. *When the Bragança Bank does not show.*—If you cannot make out the breakers on this bank, either because of a calm sea, or the tide too high, or that the sun is too low in the West,* then the bearings taken of Point Curuça, as first mentioned, become the first point of departure, and you must steer as before stated. If the bearings place you 8 miles from the point, you will pass on in 13 fathoms, which at some casts decrease to 10 and 9, and then falls again to 13 fathoms.

If before bringing Point Tijoca to bear South, you find less than 8 fathoms, you are too near the N.E. side of the Bragança, and you must bear away to the North, and keep on the required route until the point is to the South. Then you ought to mark the West face of the bank, and steer S.W. ½ W. with the ebb, and S.W. with the flood tide, to pass at the same distance as we have stated previously. It will perhaps be more prudent to run to the West after being on the meridian of Point Tijoca, until it bears S. by E., when you will have 12 and 13 fathoms. Then steer S.S.W. ¾ W. with the ebb, and S.S.W. ¼ W. with the flood, in 11½ to 13 fathoms, until Point Tijoca bears S.E. But if you find less than 9 fathoms, the lands of Tijoca being distant, and the islets Rasa and Ratos out of sight, it will show that you are too near the Tijoca Bank. If the islets Rasa and Ratos are open only a sail's breadth, and you find less than 9 fathoms, open your eyes and bear quickly to the South, for you will be on the edge of Cabeça do Sol of the Tijoca Bank.

If the islets are well open, and bearing to the W. of S., and at the same time the land of Tijoca is very distinct, and the depth diminishing, you will be too near the Bragança, and you must bear to the westward. These directions are doubtless minute, but they will prove useful in case the breakers on Bragança do not show, which is exceedingly seldom, or when the pilots, which is too often the case, are ignorant and incapable. It is not advisable to enter the channel during the night and in a calm. It will be better to anchor before reaching it, although you have the chance of losing your anchor, where they sometimes break like glass, without any possibility of assigning a cause. You ought therefore to cast anchor here, and in all parts of the river, most carefully and not quickly, and only veer out the cable as necessary.

It is high water (establishment of the port) in the Channel de Dentro at $10^h\ 51'$ in the western part, and the rise is 9¾ feet. The flood runs to S.W. ¼ S. 2¼ miles to 3½ miles. The ebb runs to the N.E. with the same mean rate. The bottom throughout is fine grey sand.

The CHANNEL DOS POCOENS.—If by any cause you should be driven into the Poço, lying between the Bragança Bank and the lands of Curuça and Tijoca you may proceed without fear as follows:—

If you have entered the Poço with the flood, it is most likely that you are nearer the Bragança than the coast, which a bearing will quickly decide. You must then get nearer the land, where there is less depth, the currents weaker, and the sea quieter than in the West part of the Poço; you can approach it without danger to within 2 miles in 7 fathoms. Being in this depth, and as near as possible in the line with Point Tijoca bearing S.E. you must anchor and await the ebb until next day, if the next ebb tide occurs after three hours after noon, that is to say, with the sun at a less elevation than 45° in the West. You may leave, however, with the next ebb, if you wish to enter the Pass de Dentro by the North, when you may beat out of the channel, preferring the eastern part of it. Point Tijoca bearing S. ¾ W. marks the East limits to the N.E. side of the Bragança Bank.

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* If the sun is low in the West, and its rays prevent these breakers from being seen, the coloured glasses of the sextant may be used to make out the passage.—*M. Arneus Dessaulsays.*

If you intend entering the Channel de Dentro by the Channel dos Poçoens you must get under way when the sea permits, and get on the bearing of Point Tijoca to the S.E., and then run N.W. more to the North or West, according as you were to the South or North of the bearing given from Point Tijoca, but preferring to keep to northward.

You will soon see, particularly with the ebb, the breakers on the Espadarte of the Bragança, which you must pass at half a mile or more. When they bear North, then steer W.S.W., and then you will be on the route stated above for going through the Dentro Channel, when you bring Point Taipu to bear South, *true*.

In the Poço the current of the flood runs S.W., with a rate of 2½ miles in common, and 3½ to 4 miles in spring tides; the ebb in the opposite direction at the same rate. It will be understood that, with such currents, you ought not to venture in this passage but with a fresh breeze and settled weather.

Let us now return to our route in the river. As we have said, we have placed the vessel's head to the S.W. ½ S., when the Espadarte is on with Point Tijoca, bearing S.E. We shall have in this track 12 and 11 fathoms in the channel, to 10, 7, and 6 fathoms. You must always keep in 6 and 7 fathoms until Point Carmo bears East, 3½ miles off. Then steer S.S.W. ½ W. as far as the parallel of Point Cocal, whence proceed so as to pass 1½ mile West of Guaribas Islet. If before you reach the parallel of Pombas Isle the depth should exceed 8 fathoms, you are too far to the West, and must bear to port, for fear of being carried too near the Morisoca and Croa Secca Banks.

South of Pombas Island the depth increases to 9 and 11 fathoms, as far as the parallel of Guaribas Island, where it varies between 13 and 16 fathoms, rocky bottom, to that of Point Chapeo Virado, when it again becomes 9 and 11 fathoms, as far as Point Musqueiro.

When on this track you have brought Guaribas Island to bear N.E. by E., and Point Musqueiro S. by E. ¼ E., you will have passed the rocky flat, the end of which lies to the North of Point Chapeo Virado, you must then steer so as to range a mile or more around Point Musqueiro, whence you may run for Point Pinheiro, where you will see to the South, taking into account the effect of the wind and the flood tide, which bears upon the islands to leeward. You must pass nearly half a mile from Point Pinheiro, to avoid a rock which lies 2 cables' lengths W.S.W. of it, and when you have doubled it, you must run along the coast until you see, through the cut to the South of the Island Paqueta Mirim, the islet which is to the North of Arapiranga, on which line lies the North extremity of the bank which extends to the North of Ilha Nova. Then steer so as to pass a short distance from the Forte da Barra, which you must not near on the North, on account of a rock lying a cable's length off in that direction.

From the Forte da Barra proceed toward the city, but do not bring the cathedral and fort in a line, on account of two banks on this bearing abreast of Val de Caens. You ought also, if the breeze is slight, to guard against the stream of flood which runs rapidly to the S.W., between the house at the mouth of the River Una and the point of the city. The bearing used by the pilots to show the edge of the bank extending from the anchorage to Fortin Island is the West angle of the hospital (a white house, standing on the West point of the city), on with the church of Carmes, in the S.W. of the city. You will anchor in 3½ fathoms, between the church of San Antonio, at the North end of the city, and that of Merces, lying in the centre.

DIRECTIONS FOR LEAVING THE RIVER.—It is a custom among vessels here, by the advice of the pilots, to quit the river only at the moon's quarters. The only plausible reason that can be given for this is, that you can leave in the morning, that is, before the sea breeze sets in; but I would rather have, for the first tide, the advantage of the greater strength of the current than a favourable wind, which is less important. Therefore the age of the moon appears to me to be indifferent, and I would advise the abandonment of this prejudice.

You must be ready at high water, and tack down as far as the Bar Fort, in the channel limited on the East by the cathedral and fort in one, and on the West by the hospital and the Carmes church (as described for entering), that is, in 4½ fathoms if it is a large vessel, and in 3½ fathoms if of light draught. When you have passed to the northward of the bank of Ilha Nova, that is, when the islet North of Arapiranga is seen through the cut, you push your boards ar far towards the islands as in 4½ and 5 fathoms. By tacking thus during the whole ebb tide you will most likely reach Point Musqueiro before the flood, or at least some point South of San Antonio Bay. If you find that you cannot, before the end of the ebb, reach the parallel of Pombas Island, you should not try to pass Point Musqueiro, as you would be obliged to anchor in deep water and rocky bottom, and be exposed to the full force of the flood tide.

The second tide being in the night, you must proceed with caution in the channel between the Musqueiro coast and Tatuoca Island, and the rocky bank North of this island. When you are North of Point Musqueiro you are beyond the limits of this latter, and can lengthen your tacks to West through the successive depths of 11½, 12½, and 15 fathoms, where they drop to 11 fathoms. Then proceed on the starboard tack as far as 9 fathoms. Going thus you will near the Croa Secca, but as the lead will not sufficiently indicate this, you must be careful in the night to West. By day, while to the South of Point Marrau, the meridian of the West side of Goujetuba Island ought to be your western limit, and to the North of the same, and South of Point Cocal, you should not bring Point Chapeo Virado to the East of South. The lead will be sufficient guide to eastward.

The currents are weaker towards the shore, which therefore ought to be avoided.

The second tide will carry you probably to somewhere between Colares and Cape Carmo. The best anchorage will be East of Point Cocal in 5 and 6 fathoms, or between Carmo and the ledge of rocks of Colares, as near the land as possible, in muddy bottom. The pilots are accustomed to anchor in the middle of the river; but it is much better as near as possible to the land, where you avoid the force of the currents.

The third ebb will most likely take you as far as the point of departure for the entrances, of which we have previously spoken, on the entering of the river. Your tacks during this tide must be guided by the lead and the distance of the land, except on the edge of the Correio Bank. As long as the islet Caramoju, in the mouth of the river De Vigia, is covered by Point Arequesaoao, you will keep clear of it by not passing the meridian of Cape Carmo. As soon as the islet is open to the point, the edge of the bank will be with Cape Carmo S.W. by S. ½ S., which bearings you must not pass. The western limits are the soundings and the seeing the land, which you must not lose sight of.

With Point Taipu bearing S.E. by S. 4 miles, you will be in a good situation for passing the entrances, of which you have the choice of that of the Dentro, and that between the Tijoca Bank and the Santa Rosa Bank, through the central shoals.

The first is preferred by vessels drawing above 16 feet, and the other by those of less draught.

Leaving by the Dentro Channel.—You must wait for daylight, and get ready by the time of high water, and then run to N.W., but not so far as to lose sight of the land of Tijoca; then veer to East, the limit of which tack will be North and South of Point Taipu, so long as Point Tijoca bears South of S. by E., or better still, while the islets Ratos and Rasa are not open of each other. In the second tack to N.W. you must not pass to North of the parallel of the Espadarte shoals, or Point Tijoca, bearing S.E. by E. ½ E. On the next tack to East you will most likely double the extreme of the Coroa Nova, and you may then run to the meridian of the Ratos and Rasa. The third tack to N.W. must be limited to 7 fathoms, and Espadarte bearing East, *true*. North of this last bearing you must shorten your tacks to the N.W., and go not beyond 7 fathoms and eastward to half a mile from the Bragança breakers.

The most dangerous point in this passage is the Cabeça do Sul de Tijoca, which lies, as before stated, with Rasa and Ratos open a sail's breadth, and Point Tijoca bearing S.E. ½ E.; these two bearings should never be brought on at one time; tacking as we have stated you will get out, if not easily, without danger.

You may also leave the river by the *Channel dos Poçoens*. After having brought the Espadarte on with Point Tijoca, and the wind will allow you to follow this bearing of S.E., you may enter the channel, ranging round the Espadarte, and steer S.E., having passed it. Run the East board to near the bank off the coast, and then tack in the Poço, preferring to beat in the East part of the channel. This new passage is the shorter and more easy than the Dentro, but it requires a good wind, which will allow the head to stand S E. It is excellently adapted for steam-vessels bound eastward.

LEAVING BY THE WESTERN PASSAGE, CALLED THE NORTH CHANNEL.—This channel, taken by vessels drawing under 16 feet, has no danger for such throughout, except the Adonis Bank, in its western part.

Leaving the anchorage of Taipu at the end of the flood, you steer N. by W., the ebb running N.E., two knots will make your course North, and on this you have nothing to fear from the Adonis. If you find (out of sight of land), having had 5 to 8 fathoms, a depth of 3½ fathoms, you have come on the Monjui Bank, when you must go more to the West and reach 5 and 8 fathoms. If the wind does not allow you to stand N. by W. you may come upon the San Joao Bank, on which there is never less than 3½ fathoms, and therefore not dangerous.

The navigation of this part of the entrance, with a strong beating wind, cannot be guided by any positive indications, if you are out of sight of land, and the land will not tell the proximity of any of the banks you wish to avoid; but by keeping in the eastern part of it, to the East of the bearing of Taipu to S. ½ W., you have nothing to fear. If, with Cape Magoari in sight from the mast-head, you find soundings of 3 fathoms, you are on the Adonis Bank, and you must then take a short tack to the East. If it is in sight from the deck, and less than 5½ fathoms, you must bear to the eastward. In general you will be too near the Santa Rosa Banks, if you can distinctly see Cape Magoari.

The Monjui Bank is readily known by the rapid diminution of the depth, and when you find the soundings increase on the North side you are outside the river. As soon as you have reached this the bottom, which hitherto has been of grey sand, becomes of soft mud.

If there is but little wind and the ebb nearly done, it will be prudent to anchor on this muddy bottom, to prevent being carried to West by the flood; but with a fresh breeze you can proceed safely in less than 7 fathoms.

REMARKS AND DIRECTIONS, BY CAPTAIN THE HON. W. WELLESLEY, 1833.

ON PROCEEDING FROM MARANHAM for the coast to the *westward*, the courses are North and N. by W., until nearly on the parallel of the Island *St. Joao*, or *St. John*; thence hauling to the westward, the eastern part may be made. This land may be known by a small white patch of exactly the same colour as the Lançoes Grandes. It is very remarkable, for the surrounding country has verdure about it, and the sand is whiter, and has altogether a different appearance. At these Lançoes is a narrow passage between St. Joao and the main.

On continuing westward you lose sight of the Lançoes, and approach the eastern point of the isle, which is low and sandy. A shoal extends from it, which always breaks. This may be rounded in 9 or 10 fathoms. On approaching it over the sandy point, a green and wooded point appears, which has a peculiar shape, from the trees at its extremity being withered or stunted. It may seem, at first sight, as if a mist were coming over the land. This should be known, because a certain sight of this point is requisite, in order to take up a good anchorage. It should not be brought to the southward of East, and you should not open a river, the entrance to which is just to the southward of it. But a most preferable anchorage is found by rounding the breakers in 10 fathoms, then anchoring at about a mile from shore, in not less than 8 fathoms, and moderately close to them.

It is to be remembered that navigators who are making the coast, and those who are leaving Maranham for the westward, should take three or four days after the full and change of the moon for the time of starting, as spring tides run very strong, about 4 miles an hour. The *Sapphire* happened to enter the anchorage during their greatest strength, and upon the flood. Many of the shoals show only upon the ebb. The ship was driven upon their edge, and anchored in 7 fathoms, in a position presumed to be safe; but when the tide turned breakers were discovered within 20 yards, and had not then the wind and tide been favourable, she might not have got clear without difficulty. To anchor at St. Joao, take, if possible, the ebb tide and quartering of the moon.

At a hut to the southward of St. Joao dwells a Brasilian, who has the charge of cattle, the proprietor of which lives on the main land. Here fresh beef may be procured in abundance. The best landing is just round the South point. You may also land at Woody Point and cut fuel, but if you remain there during the flood you will hardly pull through the entrance of the river, the tide runs in so violently.

Between St. John's and Salina, a distance of 50 leagues, the land is low.

From off St. John's the *Sapphire* steered N.W. by N. and N.W. until she had passed Cape Guarapi, which lies in lat. 0° 41′. The bay on the West of this cape is said to be not so deep as laid down in the charts, and vessels anchor mostly off the shoals. There are commonly a number of troops at Guarapi, and sometimes a Brisilian man-of-war. According to report, there are diamond mines in the neighbourhood.

A good depth to run along the coast in, well off the land, is from 13 to 15 fathoms. Further inward the depths decrease very gradually to 12, 11, and 10 fathoms.

Point Atasia (*Atalaya Point*) is 25 leagues to the westward of Cape Guarapi. On passing between, Captain Wellesley has said—Until I arrived at *Mount Atasia* the only points I distinctly made out were *Cuita*, which is a long, low, green point, and *Mount Pirausou*, which may be known by the red cliffs about it; but you must be pretty close to make the red out clearly. The directions in an old book say that Mount Atasia has a watch tower upon it, with a gun, which is sometimes fired when a vessel is seen approaching. (This is still here, though its existence has been denied.)

Mount Atasia is rather a high point, with reference to the land around it. There are two or three remarkable patches of land on it; and from the eastward it makes very distinctly, as the point and white patches cannot be mistaken.

SALINAS, or Salina, the pilot's station, is difficult to make out at 5 or 6 miles from shore; but as you open the land to the westward of Atasia, on looking carefully, a small white house will be discovered, with a red streak behind it. The white house is the chapel, and the red the tiled roofs of the cottages. It stands upon the ground rather more green than the surrounding country, and makes best on coming more directly from the northward, the whole village presenting a more enlarged appearance. It has now the lighthouse, previously described.

The best anchoring ground off this point is with the village bearing from S. by E. to S.E. by E., in from 7 to 13 fathoms of water. The *Sapphire* anchored with it bearing S. by W. in 7 fathoms, off a spit which runs from Point Atasia; but here the ground was found to be foul.*

In sending a boat ashore, the best passage in is between two breakers, a little to the westward of the village; opposite to it is a very heavy surf.

Captain Courtney, R.N., has represented the bottom, along the whole line of coast, as being composed of quicksands, to which he attributes the frequent loss of anchors. Lieutenant Stopford, who has frequently anchored on all parts of the coast between Maranham and Para, is, however, of a different opinion, but he admits that the quality of the bottom should always be ascertained before anchoring, because it is foul in many places.

DIRECTIONS FOR PARA BY MR. RICHARD THOMAS, COMMANDER OF THE BRIG MARGARET RICHARDSON, OF GLASGOW.

When bound to Para from the *northward* vessels should cross the Equator in 46° W.; then steer S.W. until they arrive in 28′ of South latitude: soundings may then be found in 17 and 18 fathoms, fine sand, with small black specks. Steer a West course from thence, keeping the lead going, and do not approach the shore nearer than in 12 fathoms of water. The white sand-hills to the westward of the *Bay of Caita* will soon be seen, appearing from the mast-head like breakers, at the foot of high mangrove trees.

The land of *Caita* must not be approached, for the water is very shallow, and the soundings very irregular off the bay, and the flood tide sets in to the West. By steering a West course, and keeping a good lookout, Point Atasia will soon be seen; it being the highest land on the coast from Mount Guarapi, with steep red cliffs at the end, and to the westward of it.

At about 2 miles farther to the westward is the village of *Salina*. The pilot station is situated on a steep cliff, and the houses covered with red tiles. A church, with the steeple near the middle of the village, may be seen.

Abreast of this point, at the distance of about 2 miles, is a bank of hard sand and stones, with 4½, 5, and 6 fathoms of water; this bank extends to the eastward as far as Caita, and the West end bears South from Salina. Within this bank is a channel with 9, 10, and 11 fathoms of water, soft mud; but, being so near the shore, it is not recommended.

After having reached the pilot station at Salina, should the weather be fine, with light winds, it is advisable to anchor, with the village bearing S.E., and in not less than 9 fathoms of water. For should it come to blow during the night, which is often the case in the rainy reason, and a vessel should part her cable, she will have sufficient room to make sail, and stand to the northward under easy sail till the morning, and by that means will avoid the reef which lies off the island *Praia Grànde*, the island next West of Salina. Should it be blowing strong on arriving off the pilot station, and past noon, the best way may be to lie off and on, under easy sail until next morning, for it would be too late to attempt to run for the banks.

In leaving Point Atasia for the *Rio Pará* make sail early in the morning, steering W.N.W. ¼ W.; keep the lead going, and be very cautious in steering and sounding, as the tides run very strong, and are very uncertain in their direction, owing to the many small rivers and banks in the vicinity. A vessel should not advance nearer than in 10 or 12 fathoms, until she comes abreast of *Maranduba*, by some called *False Salinas*. The latter is the second island westward of the village Salina, and may be known by two white patches or sand-hills, in appearance resembling the sand-hills to the eastward, but smaller.* Having passed these sand-hills, continue a course beyond the *Braganza Banks*, or breakers, still keeping the lead going.

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* From 7 fathoms, bad ground, Salina bore S. by W. ¾ W., Macussani, W.S.W., Point Atasia [Atalaya], nearly South. The best anchorage is with the pilots' station S.E. in from 9 to 13 fathoms, and not less than 4 miles from shore.

Hence to the Banks, while in the fairway, from 13, 15, and 17 fathoms will be found; and when the sand-hills bear about S.E. by E., the breakers will be seen from the mast-head on the port bow. These breakers must be left on the port hand, at the distance of about half a mile. The channel here, between the Branganza Banks and Tijoca Shoals on your starboard hand, is not 2 miles wide. Having reached the breakers, the only guide for entering the river, a vessel may steer a little more southerly, keeping the lead going; for she will then have, in mid-channel, 15 fathoms of water, with foul ground. Having advanced well round the breakers the course thence up the river will be S.W. ½ S., keeping the port shore on board.

DIRECTIONS FOR MAKING PARA', BY M. ARNOUS DESSAULSAYS, 1822.†

Vessels coming from Europe ought to direct their course so as to cross the Line between 42° 40′ and 44½° W. long. They can, within these limits, choose their passage, on account of the confidence they may be authorized to have in their position. By reckoning, the easterly point is to be preferred; with chronometers, a more westerly point may be taken. As soon as the Line is crossed, the lat. of 0° 24′, or 0° 30′ S., is to be attained.

Under the Line, between 44° 40′, and 46° 30′ W., the soundings decrease gradually from 70 fathoms to 16 or 13 fathoms.

Under the parallel of 0° 39′ S., between the same longitudes, the depth decreases from 18 to 11 fathoms, and the land ought to be made before the first depth is attained, or at least it is then to be seen. As soon as this is made out you can approach into 7 fathoms; but this is the limit, on account of the numerous shoals. There is nothing to fear from banks of very light, reddish sand, which are met with from time to time.

In running to the West, under the parallel of 0° 24′ to 0° 30′ S., the land will show as a series of promontories, running out into the sea. As you advance, fresh points discover themselves in the same manner, and when these are seen abreast they appear to be narrow, and the sea seems to break at their feet; the flat sandy shore frequently augmenting this appearance.

Great attention ought to be directed to the first land that comes in view. Cape Guarapi, which is one of the first to be seen, is also one of the most northern on the coast. It is easy to be known by a decided mount, situated in the lands at a little distance from the advanced point. The breakers at this point are real and apparent. It is a good point to recognise, because the route may be correctly estimated from it, to arrive readily at Salinas, which is 35 leagues to the West, 5° North. The reckoning may be then made for the night, and there will be no necessity to anchor; but care must be taken to keep at a distance of 10 miles from the land during the night, and not to have a less depth than from 12 to 14 fathoms.

To the eastward of this cape the land is all more southerly, and only one other point, 25 miles to the West, is nearly on the same parallel. These two places are the ones that project so far to the North, on more than 20 leagues of this coast.

Should this not be made out, you must anchor for the night. During the day run along the coast, paying attention not to come into less water than 7 or 9 fathoms.

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* These two sand-hills have, at times, been mistaken by strangers, and have proved fatal to many valuable lives, there being no landing in their vicinity. It was off this place that Captain Mann, of the brig *Warrior*, in 1827, unfortunately lost his mate and three men, by the swamping of a jolly-boat, when attempting to reach the shore in search of a pilot.

† These directions are taken from the "Instructions pour la Navigation aux Attérages et dans la Rivière de Pará," as above.

The land extending to the West consists of flats of sand, covered with wood, separated at distances by sandy tracts. The uniform aspect of these woods resembles a plantation. The shore thus continues to Caita, lying 20 leagues to the West of Guarapi.

The *River Caita* has on its western shore, in the interior, a village, which cannot be seen from the sea; and there are also, at its mouth, several islets, which are difficult to make out. A chain of hills and downs of white sand commence at the West point, and continue in an E.S.E. and W.N.W. direction for a length of 25 miles; there are islets and breakers at the foot of these downs, in front of the shore, from this point as far as Cape Atalaya, or Atasia, where these sands are more of a reddish colour. There are some woods which show themselves within the land; this is necessary to be known. The rocky and moderately high point, which is met with after these sand-hills, is Cape Atasia, or Atalaya; it is edged with rocks, more or less uncovered. In its neighbourhood the water is deeper near the land, and therefore it can be approached closer than the preceding coast. It is the most northern point that is met with after the sand-hills we have spoken of. Salinas is 4 or 5 miles from them, a little to the South of West.

This cape is a mile more to the North than Salinas; the land ought to be neared to within 7 or 9 fathoms, and then seek, in the slight indentation which the coast forms to the West of this point, for the village of Salinas, which is the only one which can be found on the whole extent of this coast.

The land at Salinas is higher than that which is passed before it. About halfway up on this land there may be seen, with the aid of the glass, a village, of which the left hand part is composed of houses covered with greyish shingles; those on the right-hand are covered with reddish tiles. Nearly in the middle is a house which is higher than the others, covered with white plaster, which sometimes appears grey when the plaster is old; it is the pilot's house; there may also be distinguished a small church and a cross.

In looking towards the right of this village the land presents the appearance of three bands of different shades of colour, which is formed by the summits of three ranges of hills, of which the tint is more feeble, according as they are more or less distant in the interior.

When arrived to the North of Salinas you must anchor, and wait for a pilot.

From this anchorage may be perceived the Point of Cajetuba to the West, which seems to be confounded with that of Tigioca. That of Marapani rests to the S.W., and Miranduba to the S.W. 5° W. The mouths of the different rivers leave tolerably large lagoons between these different lands.

ANTILLAS, &c., TO PARA'.—Vessels coming from the Antillas or Cayenne, and which are going to Para, are then obliged to proceed to the eastward, in order to be able afterwards to come southward; and then may be classed with vessels coming from the North.

Those who would make for Salinas must conform to the directions before given for finding that place. But as sometimes there may be some uncertainty as to the position in longitude, it is necessary for them to observe, that if, in crossing the Line, they should find more than 20 fathoms water, and being sure of their latitude, they may be certain that they are to the East of Salinas, and then they can make for the land.

If there should be found only 18 or 14 fathoms under the Line, great attention should be paid; you are then between the two directions of N.E. and N.N.W., from Salinas. This last position, more particularly, would lead too near to the banks at the entrance of the passages, and the currents of the flood tide would make the nearing of them very dangerous. Should you, however, make for Salinas, you must keep on the northern tack, and make for the eastward, so as not to come to the land until you have, at the point indicated, at least 18 fathoms water.

SECTION V.

THE EASTERN COAST OF BRASIL, ETC., FROM CAPE SAN ROQUE TO THE RIVER PLATA.

1.—THE COAST OF BRASIL, FROM CAPE ST. ROQUE TO PERNAMBUCO.

THE late inquiries into the best route for vessels bound across the Equator have given a much greater interest to this portion of the Brasilian coast than it had formerly, when the great object was to avoid nearing it.

We may here also again advert to the position and character of the Rocas, which lie in the offing, as given in a former page, and again recommend caution on approaching their neighbourhood.

The WEATHER, &c.—THE EASTERN COASTS OF BRASIL being almost entirely within the torrid zone, South of the Equator, are subjected to the general high temperatures of the lower latitudes, but the great diversity in the equalities of the ground, in the mountainous part of the country, produces a variation in temperature. On the sea, near shore, the ordinary state of the air is at 75° to 77° of Fahrenheit's thermometer, from March to September, and of 77° to 86° toward noon, from September to March; but in different places the temperature is higher or lower, according to the localities; for instance, at the high town of *Bahia*, or *St. Salvador*, the mean expansion of the mercury has not been found, between September and January, in the warmest time of the year, higher than 75° in the morning, 79° at noon, and 76° in the evening. At *Pernambuco*, in the same season (5° nearer the Line), the thermometer has marked 83° to 84° toward noon, and risen at times to 87°; while at *Rio Janeiro*, nearly 10° to the southward of Bahia, the prevailing heat is much greater, even at 91° to 93°. The difference is produced by the varieties of the land.

In the southern provinces the winter is rather severe; in the parallels of 27½° to 32° or of the Island of *Santa Catharina* and of the *Rio Grande de S. Pedro*, the snow falls abundantly on the high lands, and the hail at times greatly injures the plantations. More in the interior of the country, as the elevation of the land increases, so do the characteristics of winter.

The two seasons, dry and rainy, have already been described.

In reducing the seasons of the year to two divisions only, we conform, says the Baron Roussin, to the usual expression; but the diversity of exposures, the vicinity of mountains, and the various degrees of elevation in the ground, produces many local exceptions to the weather generally prevalent. At *Rio Janeiro*, for example, it rains much more in the last months of the northern monsoon, which generally is the dry season, than during the rest of the year; in November to March there are frequent storms in the evening or at sunset, accompanied with thunder and heavy rain;

these are quickly succeeded by a clear sky and fine weather. The cause arises from the disposition of the mountains which form the valley of Rio Janeiro, and to the great heat which prevails in it from the sun's diurnal passage toward and from the zenith.

By causes partly analagous, circumstances are similar at *St. Catherine's*, where storms and heavy rains have equal place during several months of the dry season; but these anomalies are limited to certain places, and do not affect on the coast in general the characteristics generally assigned.

It may therefore be said, in regard of Brasil, as of Europe, that the state of the weather depends on the situation of the sun in the ecliptic. In general the weather is fine when the sun is in the hemisphere of the place; but the contrary cause produces an opposite effect.

The worst months of the rainy season are marked by frequent fogs, extreme and continual humidity, and very heavy rains, which often continue for 10 or 12 hours consecutively; and it has been remarked that, during the rainy season, the worst weather is at the time of new and full moon, more than at any other period.

It is this time of year that several maladies prevail, occasioned by the humidity; the heats which succeed produce lassitude, and it has been observed that the maladies are so much more heavy when there is little thunder during the passage of the sun to the equinox. In the bays and on the coast they consist, principally, in dysenteries, flux of a bad character, which, being neglected, if not terminating fatally, degenerates into obstructions, indolent tumours, and chronic affections of the viscera, to be healed only by change of climate.

MAKING OF THE COAST.—The aspect of the eastern coast of Brasil, between Cape San Roque, in lat. 5° 28′, and the Isle of St. Catharine, in lat. 27½°, varies considerably in its appearance. In the southern parallels, from the isle above mentioned, to about 60 leagues to the northward of Cape Frio, the lands are very high, have many forests, may be seen, in clear weather, 18 leagues off, and may be safely approached, with the ordinary precautions, on coming in from sea.

But this is not the case in other parts. Further to the North the land declines in height, and can be seen at a moderate distance only. It must, therefore, be approached with caution. Such are the portions comprised between *Espirito Santo* and the *Monte Pascoal* [Mount Pascal], between *Porto Seguro* and *Bahia*, or the *Bay of All Saints*, between the *Tower of Garcia da Vila* [lat. 12° 32′], and *Cape St. Augustin*, and the following coast, nearly without exception, from *Olinda* to the North, N.W., and W.N.W., as described in the preceding section; whence it will be seen that, from shores of moderate height, they decline to low and sandy beaches, and so continue westward, with few exceptions, to Maranham.

The warnings which may be acquired by soundings, in the proximity of land to which you may be approaching, depend on the part you may be on. These warnings may be of little service on the eastern coast, particularly between the Isle of St. Catharine and Olinda, as the bank of soundings extend to no long distance, and great depths prevail on its outer edges; the parallel of the Abrolhos Rocks [11° S.] excepted.

The soundings give 62 fathoms at 18 leagues East from the Island of St. Catharine; 45 fathoms at 12 leagues East from that of Sebastian; 32 fathoms at 5 leagues to the S.E. of Point Joatinga [lat. 23° 27′]; 70 fathoms at 18 leagues to the S.E. of the entrance of Rio Janeiro; and 68 fathoms at 7 leagues S.E. from Cape Frio. East of the last there are 35 fathoms at the same distance.

Between the parallels of 21° and 22° South, the depths, at 12 leagues from shore, vary from 40 to 17 fathoms. At 30 leagues East from Cape St. Thomé there are more than 100 fathoms. Soundings extend more to the East and S.E. of the Abrolhos, though but little to the eastward of the meridian of 37° 10′, which is 27 leagues to the East of these islets; and beyond this there is shortly no ground at 190 fathoms.

No bottom is found at 180 fathoms at only 8 leagues to the S.E. of Cape St. Antonio, of Bahia; but, at 9 miles to the South of this cape, are 28 fathoms of water. Again, at 9 leagues on the parallel of the Morro of St. Paulo, with the Morro in sight to the West, there is no bottom at the depth of 50 fathoms.

From Bahia to Olinda the bank is generally steep; at 9 leagues to the East of the Tower of Garcia da Vila the depth is not less than 160 fathoms; at the same distance to the East of the inlet Itapicuru [lat. 11° 45′] the depth is 180 fathoms; it exceeds 170 fathoms at 20 leagues from Rio Real and Rio Sergipe [or about 11° 20′ South], and it is found to be nearly 50 fathoms at 10 leagues to the eastward of the mouth of the Rio St. Francisco. Finally, on all the coast, nearly to Pernambuco, there is found not less than 30 to 40 fathoms at 9 leagues from shore; and at less than double this distance, on the parallels of Pernambuco and Olinda, there is not a depth of less than 110 fathoms.

To the North of the parallel of Olinda the depth comparatively lessens, but it is again very great at a little distance from land. There are found from 6 to 9 fathoms only at 2 or 3 miles from Cape Branco, before the mouth of the River Parahyba, and before the *Fort dos Reys Magos*, or mouth of the *Pontangi;* the same at 4 miles off from Cape San Roque, deepening quickly to 40 fathoms, and thence continuing an increase to 10 or 12 leagues from the coast.

Hence it appears that on a great part of the line of coast between the Isle of St. Catharine and Cape San Roque the depths are, in general, either too great or too uniform to serve as a guidance, or to suffice for correcting an estimation of the route to any particular spot. But it is not to be concluded that it is useless to sound on the coast; only observing that too much dependence should not be placed on the soundings at any distance from shore.

The RECIFE, a singular ridge of coral rock which borders the coast, has been previously noticed. It extends, more or less, all the way from Point Toiro, or Calcanhar (lat. 5° 6′), to the Morro of St, Paulo, 13° 23′, and its intervals form the entrances to the various ports. It has been conjectured that this reef is based on debris brought from the coast by the constant repulsion of the waves, agglomerated by the coralline formation which grows on it, the debris being deposited as the waves become weak in the returning movement, or where a temporary stagnation at a certain distance was produced. The Recife, from its nature, acts as a breakwater, the water within it near the shore being tranquil. In these pools there is fishing almost throughout the year.

NATAL.—The first port of any consequence to the southward of Cape San Roque is that called the RIO GRANDE DO NORTE, on the S.E. bank of which is the little city of Natal: the channel to this river is protected by the Recife both on the North and South. This river, the *Pontangi* of the aborigines, is a rapid torrent in the rainy season, but in the dry season it is much reduced. A survey of it up to the town has been made by Lieutenant Edm. Scott, R.N., whence it appears that the ends of the two portions of the Recife forming the entrance are nearly on a true East and West line from each other; so that the channel way faces the North, while the reefs are nearly in the same direction. The direction between the two extremities is about 2 cables' length, and the depths 3¾ to 6 fathoms.

The depths within, and up to the town, 4 to 6 fathoms; but there are shoal banks within the reefs on both sides, while the mid-channel is clear The town is about 2½ miles from the entrance, and there the breadth of the river is three-tenths of a mile, with an increasing depth of water. Spring tides rise 8 to 10 feet.

A round fort, called the *Fort dos Reys Magos*, stands on the middle of the southern reef at the entrance; it is insulated at high water, but may be seen several miles off, and is the best mark.

Light.—A cylindrical tower on the Fort dos Reys Magos, shows a fixed white light at about 43 feet above the sea, and visible 12 miles off (1860).

To enter the river, keep a fort on the mainland, within the entrance, open of the extremity of the southern reef until the round fort on that reef is seen from the inside of it, bearing about S. ½ E.; then run in S. ½ W. till the fort on the main bears W. ¾ S., and steer for it; when within two-thirds of a cable from it proceed toward a white house on the same side, and then directly for the town, in mid-channel, keeping over to the eastern shore, as there is a shoal bank all the way up on the opposite side. The entrance of the river, according to the Baron Roussin, is in lat. 5° 45′ S., long. 35° 14′ 24″.

Natal is an old town, but its population is small. It was a place of importance during the Dutch wars, and its fortress, by which the city is still defended, was then considered the strongest in Brasil. The port admits no larger vessels than 150 tons burthen.

Mr. Koster says:—"The lower town is situated on the bank of the river; the houses stand along the bank, and there is only the usual width of a street between them and the river. This place may contain from 200 to 400 inhabitants, and here live the men of trade of Rio Grande. The bar of the river is very narrow, but is sufficiently deep to admit vessels of 150 tons. The northern bank projects considerably, and for this reason it is necessary that a ship should make for it from the southward. The entrance to the reef, which lies at some distance from the shore, also requires to be known, so that altogether the port is a difficult one. The river is very safe when once within the bar; the water is deep and quite still, and two vessels might swing in its breadth, but it soon becomes shallow, and in the course of a few miles is greatly diminished. I should imagine that six or seven vessels might swing altogether in the harbour. The bars of rivers that are formed, as in this case, of sand, are however not to be trusted to without good pilots, as they soon change their depth, and even their situation. When the tide enters, the northern bank is overflowed about 1 mile from the mouth of the harbour, and spreads over a considerable extent of ground, which even during the ebb is always wet and muddy, but never becomes sufficiently deep to prevent passing. A new road has been raised over this piece of land, which is about 1 mile in length."

At 8½ miles to the southward of the Rio Grande is the *Pontu Negra*, or Black Point, which may probably derive its name from several clusters of bushes, appearing of a dark-green colour, in contrast with the white sand which constitutes the shore. Three miles to the South of this are some red cliffs, which the pilots call *Barreiras de Inferno* (Barriers of Hell), and which extend in the direction of South, at some distance from shore. At 8 miles southward of Ponta Negra is *Cotovello*, a village to the North of the *Rio Pirangi*. A rivulet falls through an opening of the Recife, before which breakers extend to about a mile. A dozen fishing huts may be seen at the mouth of the rivulet, and some small vessels in the inlet. The reef extends North and South for 3¼ miles, and its North end, around which is the entrance to the rocky anchorage, is nearly 1½ mile off shore.

Bahia Fermosa (or Fair Bay), lat. 6° 12′, is nearly 2 leagues in extent from North to South, and has, in the middle, 4 fathoms at low water; but having much foul ground, patches of coral, with some rocks, and open to the sea, it is no safe anchorage.

The Ponta da Pipa, which is 14 miles S. ¾ E. from Cotovello, takes its name from the shape of a wine pipe. It is a rock on the point of land upon which the sea breaks. To the N.W. of it are two villages. At 1¼ mile N.E. of it is a detached shoal, of 16 feet least water, nearly half a mile in extent, but leaving a 33 feet channel inside it. There is sheltered anchorage to the N.W. of it.

At 1½ mile S.E. by S. from Pta. Pipa, is the Moleque, a projecting point, and at 5 miles southward of this is the shallow entrance of the *Cunhahu River*. *Bahia, For-*

mosa, or *Fermosa*, is 4 miles beyond this, and has only an exposed anchorage in 4½ fathoms, partly sheltered from the southward to the North of the town.

Bahia Traicao, at 19 miles to the southward of Bahia Fermosa, has been heretofore described as the best anchorage on this part of the coast; but it is only a small inlet in the barrier reef, not possessing such advantages as have been described, and it offers no shelter against winds from between North and South by the East.

To the northward of the Bahia Traiçao the coast entirely changes the nature of its aspect, and presents a continuous line of downs of white sand, covered at intervals with bushes, and variegated only by several clusters of cocoa-nut trees. Hereabout the *jangadas* or *rafts* of the coasters, common to the southward, as well as habitations on the beach, almost entirely disappear, and all circumstances indicate the sterility of the country and deficiency of population. Near this parallel commences the *Sertao*, a vast territory extending to the N.W., noted for its sterility, and little better than a desert.

RIVER MANANGUAPE.—At 5 miles to the southward of the Bahia Traiçao, in the inflection of the coast, is the little River Mananguape. The coast between is distinguished by several small reddish cliffs, and is fronted by the straight barrier reef, at three-quarters of a mile off shore. The river is a stream navigable by the coasters only. Its South point is of sand, woody, very low, and it projects to the N. by E., terminating in breakers, on the North side of which is the entrance. On the North side of this entrance is a village, *Coqueirambo*, which may be seen from the offing.

RIO PARAHYBA, or Parahiba.—This river, the largest in the neighbourhood, is a place of considerable trade. Its entrance may easily be found by making *Cape Branco*, which lies 12 miles to the southward.

The PROVINCE OF PARAHYBA comprehends the larger portion of the old captaincy of Itamaraca, and extends West nearly 200 miles to the boundary of Ceara. The river Parahiba, or Parahyba, which rises in the Serra do Jabitaca, flows to the N.E., and falls into the Atlantic by two channels, divided by the Restinga, or Island of St. Bento. The coast of Parahyba extends about 60 miles along the shores of the sea and bays of the town. The absence of industry and the state of morals in this province has been severely animadverted upon in Brasil.

Mr. Kidder sailed to it in a sort of catamaran, called in Brasil a *jangada*. They started from Itamaraca by moonlight for Parahyba, with a tolerable breeze from the land, and as these coasting craft pass usually within the reefs which lie off the shore, they seldom encounter a rough sea. Every village along the coast was adorned with its grove of cocoa trees. Several jangadas engaged in fishing were also passed. The coast presented sandy beaches, now and then intercepted by perpendicular bluffs of red soil, from 20 to 60 feet high, over which, to their verge, grew shrubs. On doubling Cape Branco he was landed at Tambahu Tambuin, only 3½ miles across the country from Parahyba, where the voyage by sea would have been 30 miles round another cape. Not being able to procure horses he, with some others, walked to the city of Parahyba.

CAPE BRANCO is a projecting headland, in lat. 7° 8½° S. It is a steep, cliffy shore of white sand, which may be distinguished edgewise from North to South, but blends with the adjoining coast when in sight from the offing. Two remarkable cocoa-nut trees mark the extremity of the cape. At 2 or 3 miles from the land there are 7 or 8 fathoms of water, bottom of sand, oaze, and coral. The coast hereabout affords neither anchorage nor shelter.

From off Cape Branco the country to the N.W. appears like two plains, which, on advancing, become distinctly marked. The outer one by the sea is low and sandy, but woody in the higher part; the inner plain presents a line of small hills, wooded, and pretty in appearance. The river Parahyba flows between the two plains, and its direction is S.S.W. from its mouth, which is situated in lat. 6° 56′ S.

The South point of the mouth of the Parahyba is low, sandy, and woody, and forms the extremity of the first plain above described. The barrier reef extends in front of this plain, at the distance of nearly half a mile. The North point is formed on the second plain by a more elevated coast, and on it are some cocoa-nut trees. On the height to the N.W. is the conspicuous convent of *Nossa Senhora da Guia.* Extensive breakers indicate the mouth of the river, in front of which, at the distance of 3 miles, there are 10 fathoms of water.

Of the two points which form the outer entrance of the river, that on the South is called *Ponta Balea* (Whale Point), although the fishery for whales does not extend to the North of Bahia; that on the North bears the name of *Ponta Lucena.* These points bear from each other N. by W. and S. by E. 3½ miles; both are distinguished by extensive breakers.

Shoal water extends fully 2 miles to the eastward, and for 3 miles to the N.N.E. The outer shoals, the *Baxios da Lucena,* are nearly dry on their outer edge, which forms a straight line, trending due North and South, and whose northern point is 5 miles from the Barra da Parahyba.

On the shore within Ponta Balea is a low fort, *Cabedello,* which may be seen from the offing when traversing off the mouth of the river, and it serves as a point of recognition for the low and even coast, which is destitute of other buildings. The bar is shoal, and dangerous to a stranger, and its best water at low tide is 2½ fathoms. Pilots come off and bring vessels to a roadstead off the fort, in order to be visited.

The city of Parahyba is about 4 leagues from the sea, but the sinuosities of the river make the distance 6 leagues. Vessels of 150 to 200 tons cannot proceed much above the Fort Cabedello, but small vessels go up to the town, and load with cotton, sugar, Brasil wood, &c.

Fort Cabedello, on the eastern side of the entrance, stands in lat. 6° 57′, long. 34° 47½′. Variation of the compass, 9½° West. High water, on full and change, at 5ʰ. Springs rise 9 to 12 feet, The land breeze is seldom experienced here.

The remarks of Captain de Roos, R.N., in 1832, are as follow :— .

"The river Parahiba do Norte, which is situated 67 miles North of Pernambuco, has an extensive commerce, and is generally visited by ships homeward bound from that port, to complete their cargoes. Vessels drawing 16½ feet water can safely enter at the springs.

" The coast here trends North and South, and the direction of the river is S.S.W., nearly in a straight line. On the South point (Balea) of the entrance, which is low, sandy, and wooded, is built the strong fort of Cabedello. The North point is also low, with cocoa-nut trees upon it; but immediately behind is some high wooded land, on the point of which the remarkable convent de Guia is distinctly seen. The barrier reef terminates abreast of the South point, when the bar commences, and continues till it reaches the extensive shoals which stretch out from Point Lucena.

" Ships approaching from the South are recommended to make Cape Branco, which is 4 leagues South of Cabedello. It is a remarkable point, with two cocoa-nut trees on the very extremity. From the northward the latitude may be run down, when Cabedello Fort will appear. It is the only fortress for many leagues upon the coast, which otherwise bears a great sameness of appearance. Ships should on no account venture into less than 6 fathoms af water.

" A gun fired will bring off a pilot; they come in 'jangadas' * from the Coco village to the South of the fort, and are considered expert and trustworthy.

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* " A voyage at sea upon a jangada is not an incident of every day's occurrence, at least with North Americans. Nor is it easy to convey in words a perfect idea of the simple and

"The bar is at some distance from the land, and as the passage is tortuous, it is not safe to attempt to enter without a pilot. On it there are 8 to 14 feet of water at low water spring tides.

"The bottom is sand, in some spots hard. There are breakers on either hand, and the marks which are given are difficult to distinguish, and therefore not be depended upon.

"The land winds are not of frequent occurrence. Vessels therefore have generally to beat out against the prevailing N.E. wind, which blows steadily. H.M. sloop *Algerine*, working out in October, 1832, made twenty-one tacks.

"It is usual for all ships entering to anchor off the Fort Cabedello, in order to be visited; after this they are at liberty to proceed up the river. H.M. sloop *Algerine* was anchored with the fort bearing, by compass, S. 60° E., distant a quarter of a mile, in 5½ fathoms. Bad water and few supplies are to be found at this place.

"A different pilot is appointed to take vessels up the river, which, as the wind is generally fair, is an operation of little difficulty or danger, and is almost always effected in one tide. The two shoalest spots are situated, one just above Cabedello and the other abreast of the entrance of the Tambia river. Going down is tedious, as ships have beating winds, but the reaches are long. The bottom throughout is soft mud.

"It is necessary to warp into the anchorage off the city, which is perfectly sheltered and secure. Indeed, the only vessel ever lost in the river was one which, by inadvertence, grounded upon her anchor and foundered.

"Water is to be procured by sending boats with casks up the river. That of the Tambia is celebrated for its purity. Provisions may be had in abundance, and at a very moderate rate.

"The town of PARAHYBA contains about 3,000 inhabitants. The principal street is broad and paved. The houses are mostly of one story, with the ground floors as shops, and some have glass windows. Here are six churches, and some convents, with several public fountains. The prospects from the windows present the finest Brasilian scenery; extensive and evergreen woods, bounded by a range of hills, and watered by several branches of the river, with here and there a whitewashed cottage upon their banks, half concealed by lofty trees.

"The lower town consists of small houses, and is situated upon the borders of a spacious basin or lake, formed by the junction of three rivers, which from hence discharge their waters into the sea by one considerable stream. The banks of the basin are covered with mangroves, as in all the salt water rivers of this country. The lands of the captaincy are rich and fertile, and the sugar is considered as equal to the best in any other part of Brasil.

"The river is very winding, and is not navigable beyond the present anchorage. Canoes go up a long distance, although in the summer season the bed of the river becomes dry beyond 20 leagues. Its prevailing course is N.W., and the town is situated upon the southern bank.

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singular structure by which the savages of Brasil were accustomed to traverse the waters of their coasts hundreds of years ago. Although in constant use since the period of discovery, the jangada has preserved its aboriginal form and style of construction, and even in this age of improvement is not likely to undergo any change for the better. Properly speaking, it is merely a raft, composed of unhewn logs of a peculiar light wood, called *pau de jangada*. Trunks of trees are selected about 6 inches in diameter, as nearly straight and uniform as possible. These are stripped of bark, sharpened at each end so as to cut the water, and then fastened to each other by three rows of transverse pins. The number of logs used is generally six, although I have seen them composed of three, four, seven, and twenty logs. These latter are used as lighters for unloading vessels, and are nearly square in form, while the sailing jangada is rectangular, and generally about 5 feet in width by 16 or 20 in length." —*Kidder's Brasil*, 1844.

The coast from Cape Branco trends generally directly South by compass, and, like much of the coast to the northward, is fronted by reefs which run in ridges parallel with the shore, with narrow and shallow channel between the ridges, and sometimes with entrances across the outer line of reefs, which are nearly dry at low water. Off Cape Branco the outer edge is above a mile off the coast, and the first opening southward of it is the *Barreta do Aratu*, 2¾ miles from the cape. *Petimbu Point*, with a church to the South of it, is 14 miles South of Cape Branco. Here the reef extends fully 1½ mile, and uncovers at low water, but within the northern end is an inlet of the reef which would afford anchorage in 4½ fathoms, sheltered from the South by the reef.

Point Coqueiros or *Guia* is 3 miles southward of Petimbu Point, and is nearly the easternmost point of South America, Point Pedras to the South being slightly more projecting. Point Coqueiros may be known by a conspicuous plantation of cocoanuts which stands upon it. The reefs here extend for nearly 3 miles off, drying out nearly to that distance.

Rio de Goiana.—At 3 miles S.S.W. from Coqueiros Point is the entrance of the shallow and tortuous River Goiana, or Goyanna. The bar is 3½ miles S.E. from the same point, and has 12 feet over it at low water; the outer channel between the extensive reefs trending first to the S.S.W.

Point Pedras, in lat. 70° 35′ 10″ S., long. 34° 46′ 50″, is the easternmost point of Brasil and of South America. It is 7 miles South of the entrance of the Goiana. The outer reefs lie fully 4 miles from the coast, and are parallel with it. The general depths on them being 14 to 16 feet, but inside of them is a channel with from 3¾ to 4½ fathoms, but inside of this channel the sands are nearly dry at low water.

ITAMARACA ISLAND.—At 4¾ miles S.W. by S. from Point Pedras is the North point of this island, whose eastern side follows the general trend of the coast, but it is insulated by a crooked channel, which makes it about 8½ miles long by 3½ broad. At its North end is a shallow and difficult channel, called the *Barra*, or entrance of Catuama, which admits nothing larger than small craft, although in some parts there is more than 3 fathoms at high water. At the South end it has been said vessels of 300 tons may enter, on a W.S.W. course, between the reefs, which extend outward 2⅔ leagues; but it must be with a fair or leading wind, as there is not sufficient space for tacking. In the channel at low spring tides there is a depth of 3 fathoms, and the tide rises 9 feet. The river in the narrowest part is a musket shot in breadth, and at this narrowest part has a bank, which has a depth of 2½ fathoms over it at low water spring tides. Immediately above this bank is deep water, and so smooth that a ship may ride with any sort of cable. To this anchoring place from the bar the distance may be about a league.

Itamaraca has been fully and pleasingly described by Mr. Koster. This is one of the oldest settlements of the Portuguese upon the coast, and was given to Pedro Lopez de Souza, who took possession of it in 1531. In the year 1630 it had 23 sugar-works upon it, but as a commercial station it has fallen into insignificance. The island, however, is still populous, and has several pleasant villages, the inhabitants of which live much more happily than a stranger would imagine. The shores are planted with cocoa trees, among which are thickly scattered the straw cottages of fishermen; in some spots may be seen respectable whitewashed dwellings, and there are salt-works on the island, which are one great sonce of its wealth. These are formed upon sands, which are overflowed by the tide at high water.

Mr. Koster says the southern harbour is good, and the entrance to it commanded by an old fort, which is much out of repair. The entrance to the port is formed by an opening in the reef. It is readily discovered from the sea, being immediately opposite to the channel or river into which it leads, and as there are breakers both to the northward and southward. Having entered, some small breakers will be seen ahead, or rather toward the South side of the channel, unless the tide is out, and then the water is quite still. The anchoring ground is opposite to the fort, and on the outside of it; but opposite to the village of Conception (*N. Sa. da Conceiçao*), which is further in than the fort, there is considerable depth of water. Some parts of the ground are rocky, but others good.

PAO AMARELLO.—The bar of Pao Amarello is in lat. 7° 58′, long. 34° 49′ 55″. This little harbour is formed by a break in the reef or *wall*, which here runs parallel to the shore, both to the northward and southward. There is a depth of 3 fathoms near the entrance, but it is a spot of difficult access, lying between the reef and the land, and is unsafe, because the channel is so narrow that it is necessary to ride with one anchor on the reef and the other on shore, to prevent the ship's swinging with the tide.

The shore between this place and Itamaraca is composed of woody hills, cultivated and separated from the sea by a beach of white sand, at 2 or 3 miles from which you may find from 10 to 14 fathoms of water, bottom of sand and gravel.

The coast hence southward to Olinda increases in height, and may be seen from a distance of about 6 leagues.

On advancing to the Amarello, you may see on the beach a small battery, intended to defend the opening of the Recife. Vessels drawing 6 or 7 ft. of water which enter here may proceed with high water hence to Pernambuco, by passing within the Recife and banks of Olinda.

At 7 miles to the southward from Pao Amarello is the POINT OF OLINDA, in the parallel of 8° 1′ South. The navigation of the coast between is impeded by extensive reefs. Ships coming from the northward should, in passing the point of Olinda, give it a berth of 3 miles, keeping in not less than 10 fathoms, for within that distance the soundings may become irregular, and the reef in many parts is steep-to.

PERNAMBUCO AND OLINDA.

The Cities of Pernambuco and Olinda are the principal places of trade on the Brasilian coast, next to Rio Janeiro and Bahia. The land in the vicinity is fertile and well cultivated, producing principally sugar and cotton. It is not of that elevated and grand description as the land about Rio, hereafter described, but it affords the most pleasing prospects, from the richness of its plains and the numerous seats scattered in every direction. The summit of Olinda, on approaching the land, may be recognised at a distance of 5 or 6 leagues.

PERNAMBUCO.—The RECIFE, or REEF OF PERNAMBUCO, which forms the harbour, runs in a parallel line with the shore, at about a musket shot distance from Cocoa-nut Island to the southward, to abreast of Fort Bruno to the northward. On the extremity of the latter is a small octagonal tower, called PICAO. This tower assists Fort Bruno in commanding the immediate entrance to the harbour. Between the Picao and Fort Bruno is the harbour bar, the greatest depth on which at low water is 10 feet, and is formed by an accumulation of sand washed through a natural break in the reef at a short distance from the Picao tower. This break has been frequently filled up by the Brasilians, but all their efforts to exclude the sand totally have hitherto proved ineffectual, so that the water on the bar gradually decreases in its depth, and the inhabitants in consequence are under the greatest apprehension of the harbour being in time choked up.

Large ships discharge and take in their cargoes in a basin called the *Poço* or *Well*, immediately at the head of the reef, and outside the harbour. The entrance to the latter is between some detached sunken rocks, apparently a continuation of the reef, called the GREAT BAR. It has on it 17 feet of water, which increases to 20 within, where the vessels moor. The inner, northern, and southern sides are formed by the gradual decrease of depth toward the shore, and are sandy.

Small vessels run over the *Bar of Picao*, called also the LITTLE BAR, which has 12 feet on it; the marks for it are the two turrets of the southern angles of Fort

Bruno in one. Over one or the other of the two bars described all vessels must pass to go into the harbour.

At the distance of 1¼ mile E. by N. from the Picao tower lies the body of the ENGLISHMAN'S or ENGLISH BANK, in length from North to South three-quarters of a mile, and in breadth from East to West half a mile. The shoalest water on the bank is 2 fathoms; the bottom is excessively rocky, as well as its neighbourhood. The marks for it are a large cocoa-nut tree, distinguishable from all parts of the bay, and situated between the two most elevated houses on the hill above OLINDA, in one with a kind of jetty on the beach immediately under that town, and bearing N. ¼ E. The cross bearing for the southern extremity must be taken by the compass, the Picao tower due West. Its outer end is marked by a red and white can buoy, and its South end by a red buoy.

Between this bank and the Basin, or Well, is a passage of 5 fathoms, nearly half a mile in breadth.

In the offing the bottom is composed of fine white sand, but nearer the coast numerous patches of coral are interspersed, dangerous to cables. The best anchorage for men-of-war is with Olinda North, and the Picao tower N.W., in 6 fathoms, as this is the only spot in the bay, near the town, where they can lie without the danger of parting in the space of three or four days.

Ships from the *northward*, on sailing in, should give Olinda Point an offing of 3 miles, never decreasing the depth to less than 10 fathoms, for within that depth the irregularity of the soundings may become alarming to a stranger. When abreast of Olinda, with the offing described, a S.W. course will reach the anchorage, clearing English Bank about a mile, and gradually altering the depth to 6, 8, and 6 fathoms.

The LIGHTHOUSE, with *revolving* light, at the entrance of the harbour, was first lighted 2nd February, 1822. It stands about 50 yards from Fort Picao, on the point of the reef. The tower, octagonal and painted white, stands on a rock which is covered at one-quarter flood. The lantern exhibits three flashes in succession from sunset to sunrise, of which two are brilliant, and the other *red* every two minutes, and may be seen from the mast-head, in clear weather, 20 miles off.

CAPE SAO AGOSTINHO, or ST. AUGUSTIN, 17¼ miles southward of Fort Picao, is a high, rugged, and projecting promontory, which may be readily known by its red cliffs, with a church and barn on its summit. It has also, on its eastern extremity, a battery, which is difficult to be distinguished at any considerable distance. The Cape is described by M. Roussin as a hill lightly wooded, of moderate height, declining gradually to the sea; remarkable by the red cliffy spots on the termination of several points, by its arid aspect, and the church on its summit, with the battery to the E.N.E., intended to protect several small anchorages in the vicinity, but which appear to be no longer used.

By giving Cape St. Augustin an offing of 6 or 7 miles when bound to Pernambuco from the southward, and steering a N. by E. course, you will soon gain a sight of the city of Olinda ahead, situated on the northern extremity of the height, which contains the *Harbour and Road of Pernambuco.* The city stands principally on the southern declivity of a pleasant hill, and when the highest buildings are well in sight, Pernambuco will be discovered to the southward of them, the site being low and sandy.

The PROVINCE of PERNAMBUCO has constituted one, if not the most important part of the Brasilian empire since the Dutch conquest. It abounds with many good harbours, and the soil is very fertile. Its capital has been called the Tripoli of America.

The British consulate of Pernambuco embraces the provinces of Alagoas, Pernambuco, Paraiba, Rio Grande do Norte, Ceara, and Fernando Noronha; with an extent of coast of upwards of 800 miles in length. Its ports are all formed by that wonder of nature, the Recife. Mr. Cowper, H.M. Consul at Pernambuco, considers that this reef is of coralline origin, and that when it has reached the surface, the insects abandon their labour, and the interstices of their beautiful fabric become choked with sand and broken shells, which after a time become incorporated with it, and form in appearance what is a rough sandstone.

PERNAMBUCO, or, as this city is more commonly called in the country, the Recife, or the Reef, is situated close to the Atlantic coast. Its free population, including the suburbs, was stated by the British consul, in 1845, to amount to 74,310 inhabitants, and the adjoining town of Olinda has 17,824, so that the total number of free inhabitants in these towns, exclusive of slaves, was 92,134, among whom are enumerated 160 French, 125 English, and 300 Germans, including 200 German labourers, who arrived under contract for the service of the provincial government. Of United States citizens the number seldom exceeds 10 or 12. In 1857 the same authority estimated the total population at 120,000.

The appearance of Pernambuco, when seen from the water, is peculiar; its side is flat, and but little elevated above the level of the sea. The white high buildings erected on the praya seem to rise from the ocean. Inseparable from this view of Pernambuco is that of Olinda, on a bold and picturesque hill 2 miles North. Its natural appearance caused Duarte Coelho, as he arrived on the coast, in 1530, to exclaim, " O linda situaçao para se funda uma villia!"—" O beautiful site for a town!" His exclamation was immortalized by being used, in part, to furnish a name.

Olinda continued the capital of the province for about 200 years; but at length, owing to its situation not being favourable for commerce, from being too far from the Recife, which forms the only harbour near, a town gradually arose up near the Recife, by which name it was called.

Mr. Consul Cowper says: Pernambuco, from its geographical position, upon the easternmost point of South America, should be one of the most important in the world. The whole of the commerce of Europe, and the East coast of North America, to and from the Pacific and Indian Oceans, the Chinese and Australian Seas, must pass and repass in its vincinity. Independent, therefore of its direct commerce, nature appears to point it out as the port of call, or refuge, for vessels requiring refreshment or repairs; but unfortunately its capabilities are limited. Easy of approach, with a capital lighthouse, visible 16 miles at sea, protected entirely from the sea by the Recife, which here presents two excellent and deep entrances, a bar of sand runs from the main land to Fort Picao, upon the reef, which will not admit vessels drawing more than 15 to 18 feet water, and even the latter with safety at spring tides only. The term safety as opposed to danger, is scarcely to be used in relation to this impediment, as it lies within the harbour, and in smooth water. I have no doubt but this bar might be removed by good dredging machines, if kept perpetually at work, otherwise, the tide running in and out at the lighthouse passages, would speedily cause a renewed accumulation of sand; but more is required than the mere removal of the inner bar to enable navigators to avail themselves of the unequalled natural position of this port, namely, to increase its limits; and this should be the very first object of the government. At present the available anchorage within the harbour is not more than half a mile in length, with a breadth, independent of the fairway, admitting of four tiers of vessels, not exceeding 350 tons.

Ships of war seldom remain here long. None of large draught can pass the bar, and those that can are required to deposit their powder at the fort. The strong winds and heavy roll of the sea are frequently sufficient to part the strongest cables. The commercial shipping is under full view from the observatory; yet it is too near at hand, and too densely crowded together, to make an imposing appearance.

OLINDA, built upon a hill, has white houses and massive churches, with luxuriant foliage interspersed among them, in which those edifices on the hill side seem to be partially buried. From this point a line of highlands sweeps inward, terminating at Cape St. Augustine, and forming a semicircular *reconcave*, analogous to that of Bahia. The summit of the highlands is crowned with green forests and foliage.

At a distance of from one-fourth to half a mile from the shore is the bank of rock already mentioned as extending along a great extent of the northern coast of Brazil. Its top is scarcely visible at high water, being then covered with a surf which dashes over it. At low water it is left dry, like an artificial wall, with a surface sufficiently even to form a promenade rising out of the sea. It is from 2 to 5 rods in breadth. Its edges are a little worn and fractured, but both its sides are perpendicular to a great depth. The rock in its external appearance is a dark brown colour. When broken, it is found to be composed of a very hard species of yellow sandstone, in which numerous bivalves are imbedded in a state of complete preservation. At several points deep winding fissures extend through a portion of the reef, but in general its appearance is regular, much more so than any artificial wall would be after exposure for ages to the surges of the ocean.

Opposite the northern end of the town, as though a breach had been artificially cut, there is through this reef a channel of sufficient depth and width to admit ships of 16 feet draught at high water.

Close to this opening on the extremity of the reef stands the fort, built by the Dutch. Its foundations were admirably laid, being composed of long blocks of stone imported from Europe, hewed square. They were laid lengthwise to the sea, and then bound together by iron. A wall of the same origin extends from the base of the fortification to the body of the reef.

Pernambuco carries on a great foreign and domestic trade. The coast near it is very low, and the country well clothed with woods in perpetual verdure, which, contrasted with the white cottages scattered along the shore, the Indians fishing in their jangadas or canoes, and the beautiful serene sky, affords to the European, as he approaches it, a most pleasing prospect.

The islands on which the town is built were connected by two bridges, one of which is a most beuatiful structure, constructed by the Dutch, when they took this place from the Portuguese in 1670. It consists of fifteen arches, under which runs a strong and rapid river, that comes many hundred miles down the country. On each side of this bridge are shops full of European merchandise, particularly English manufactures, or, as they are called by the Portuguese, "*Facendas Inglesas.*" The river is seen winding up as far as Olinda, which is seated on a hill; on either bank beautiful white cottages, intermixed with mangrove and cocoa-trees and fruitful vineyards, the Indians paddling down the river with their unwieldy canoes, the fishermen on the beach drying their nets, and nature displaying her gayest verdure, form altogether a *coup d'œil* which it is impossible to describe. The other bridge is a very long wooden one, in which there is nothing remarkable, more than its being quite open to the breeze which comes down the river. It is, on that account, much resorted to in the evening, especially by the English, who, seated on each side, often amuse themselves by criticising, with the characteristic liberty of their country, the numerous passengers.

A new iron bridge has been constructed over the river Capiberibe, and another over the confluence of that river with the Beberibe. The town is supplied with water from a reservoir, about 9 miles distant. It is conveyed in a main of 12 inches in diameter, and distributed by thirteen stand-pipes and fountains at different parts of the town, and sold at the rate of about one halfpenny per cubic foot. The ships in the harbour are supplied by lighters and canoes at the same rate. The town is also lighted by gas by an English company. The gas works were executed under the direction of Mr. Bowman, an English engineer, and cost less than the estimate, and return 15 per cent. per annum.

The harbour of Pernambuco is wonderfully convenient. It is formed by the natural pier, extending 5 miles in a direct line. This is a coral reef so exactly straight and even that one would almost imagine it the work of art. The vessels lie alongside each other in tiers, moored head and stern, at about half-pistol shot from the shore, and close to this reef, which at high water spring tides is nearly on a level with the surface of the sea, and forms an excellent barrier.

The *railway*, which commences at Recife, is a portion of a project which was to connect the River San Francisco at a spot above the falls of Paulo Affonço with Pernambuco, and to be 400 miles long. Of this 77½ miles have been completed to Una, a single line opened on November 30, 1862. It was made by Englishmen with English capital, and with a guarantee of 7 per cent. per annum from the Brasilian Government. It has cost £1,800,000. It barely pays its expenses, though passing through a very rich district.

The charges for pilotage and port dues are very high. "Among the burthens that are suffered here by commerce and navigation, the most onerous are the charges for pilotage over the bar, and for the repeated changes that are made in the mooring of vessels.

"To enter the port and anchor in the harbour, the vessel pays its first tribute. It pays a second in order to pass to the place where vessels are loaded or unloaded, according to circumstances, and pays a third in case of having brought cargo, because, the discharge completed, she must go to the place where vessels are loaded."

Several vexatious formalities have been dispensed with, but still the charges amounted in the aggregate to about twenty-five shillings a ton—an intolerable burthen.

At Pernambuco the heat is excessive, the thermometer frequently being at 90° in the shade. During the night it is always calm, with much lightning. At about 9 a.m. the sea breeze comes gradually, and is strongest about noon, when by degrees it dies away into a calm, that generally takes place toward sunset.

PARTICULAR INSTRUCTIONS FOR PERNAMBUCO, ETC.

Having given above the general description of Pernambuco, by Capt. Hewett, &c., we now add more particular instructions from the *Pilote du Brésil* of the Baron Roussin, annexing to the same those of a British officer more recent.

The *true* bearing and distance of Cape Agostinho, or St. Augustin, from the point of Olinda is S. 17° W. (by compass, S. 26½° W.) 17½ miles.

Cape St. Augustin is the point or landfall which vessels generally make when destined for Pernambuco during the southern monsoon. The coast to the North of this retires half a league to the West, and forms a slender bay (*Gaybú*). The middle of this coast is marked by the chapel of *Nossa Senhora do Rosario*, built on an elevation about half a league inland, and having two towers, or steeples, which facilitate a knowledge of the place when coming in from sea. The shore is low, and covered with trees nearly as far as Pernambuco; and in coasting along shore at from 2 to 4 miles off there will be found from 11 to 17 fathoms of water, bottom of sand with a mixture of broken madrepores.

After having recognised Cape St. Augustin, which is situate in lat. 8° 20′ 41″, long. 34° 56′ 34″, you may proceed to the northward, at 2 or 3 miles from the coast, until you raise the Fort Picao and lighthouse, between the N.W.. and W.N.W.; then steering for the latter it may be approached, according to the vessel's draught, until you bring the cocoa-nut tree of Olinda, standing between the two highest edifices of the city, nearly N. by E. On this bearing you will be at about three-quarters of a mile from the lighthouse, and you may anchor in 6 or 7 fathoms, bottom of sand with shells and patches of coral; bad bottom, it is true, but which it is almost impossible to avoid entirely in the Road of Pernambuco.

When coming to the port during the northern monsoon, it is proper to make the coast a little to the North of Olinda Point, which is in lat. 8° 1′ S., long. 34° 50′. From this point the coast, as already noticed, is bordered with a rocky shelf and breakers, extending outward about 2 miles, and should therefore be passed at the distance of 3 miles in 8 or 9 fathoms, and until you bring the lighthouse and Fort Picao at several degrees to the North of West, thus avoiding the *English Bank*, a flat of sand and rock before described, and over which the sea breaks in adverse weather. A *red and white can buoy* was moored at its outer end in 1855, in 5 fathoms at low water with Sé church tower W.N.W. ¼ N., the flagstaff at Fort Buraco W. by S. ¼ S., and the tower of the Naval Arsenal in Pernambuco S.W. by W.

The Road of Pernambuco is dangerous in such weather, as the swell is then very strong. The anchorage is on a rhomb to the West of the meridian of Olinda Point, at less than half a mile from the Kay or Recife of Pernambuco; and there is some risk of driving on shore with a strong wind from the points between S.S.E. and E.N.E., more particularly in the adverse season or southerly monsoon, March to September, when the winds are frequently violent.

The northern monsoon is at times not more favourable than the other to the surety of vessels which anchor here. Easterly winds are more frequent than those from the North, especially on the approach of new and full moons; and although in this season the weather is commonly fine, and the breezes weaker than those of the opposite season, it is requisite to take all precautions against accidents, and the first of these precautions is not to anchor too near the land. We have noticed that the bottom of the Road of Pernambuco is of bad quality; in fact, this anchorage with a cable liable to be cut off, offers no security.

Vessels commonly moor E.N.E. and W.S.W., in order to have a long warp toward the offing, as well as to be more firmly situated, and more ready for getting under weigh. It is prudent to have the sails and all things so disposed as to get under weigh promptly, should it be required. In the contrary case, drop an additional anchor in the evening, which you raise next morning.

Should you be obliged to remain some time in the Road during the southern monsoon, it may be convenient to have two anchors ahead toward the offing, and one anchor on the poop, to drop toward the W.N.W., in order to hinder the vessel's drifting during the calm which often succeeds a squall. The last anchor serves to resist the land breeze, which, however, is rare in this season, and not strong in the road at any time of the year.

The harbour of Pernambuco, formed on the East coast by the Recife which borders the shore, is sufficiently large and deep for receiving a certain number of vessels drawing from 10 to 12 feet of water. This port, as already noticed, is divided into two parts. The first, or exterior port, is named the *Poço*, or *Well*, and is simply an anchorage situate at the head of the reef to the North of the harbour. Its entrance is formed by several rocks or flats of detached madrepores under water, and which are probably a continuation of the principal reef. This entrance is named the *Great Bar*, and on it are from 17 to 20 feet at low water. Within it vessels moor with four fasts, the head to the offing. The ground of the Poço is of sand, and the depth decreases toward the shore. This place is open to the wind from the offing, and the sunken rocks at the entrance render it untenable during the northern monsoon. Its military protection consists of the Forts Bruno and Buraco, standing on the beach three-quarters of a mile from each other.

The harbour of Pernambuco, or *Port of Recife*, properly so called, is comprised between the kay of rock and the city, and is named the *Mosqueirao*. It has from 2 to 3 fathoms of water, and is sheltered from the sea by the Recife. In this place are from 8 to 6 feet at half tide; but for entering they must pass over a bar of sand, on which at low water the depth is not more than 7 feet. This bar is defended by the Forts Bruno and Picao; built, the first on the beach, as already noticed, and the other on the extremity of the Recife, to the southward of the lighthouse. The distance of one of these forts from the other is three-tenths of a mile.

The marks for sailing in by the two passages leading into the port of Pernambuco, are:—

1st. For the Poço, or Well, a small pyramid built on the beach, surmounted by a cross, and called the *Cruz do Patrao*, in a line with the church of *St. Amaro*, on the continent, which is surrounded with cocoa-nut trees. These are a little way up the country, and clearly seen. The bearing of the objects in one is nearly true West. But before the leading mark is brought on, approaching from the offing, you must avoid the English Bank by observing the precautions already mentioned. From the Poço, or Well, this bank bears nearly East, less than a mile. Its shallow part is indicated by breakers. Having entered, you will see all the interior of the harbour, having the lighthouse to the South, and by proceeding S. by W. [*S.* ¾ W.] you gain the port of Mosqueraio.

2ndly. Smaller vessels commonly take, on entering, the pass *immediately to the North of the lighthouse* standing on the Recife; the direction for which, as before shown, is to bring the two southern turrets of Fort Bruno in one, and keeping this mark on, with 18 to 15 feet of water, until you see the western or the inner edge of the Recife, with Fort Picao to the South, when you proceed along it until you have entered the harbour, and, having advanced to a proper distance, you make fast on the port side.

The chief pilot of Pernambuco said, in 1855, that at spring tides the bar of the port has 20 feet water, and that the smaller bar has from 16 to 17, over which vessels drawing from 14 to 15 can enter: those drawing as much as 17 can do so no higher than the Poço.

The predominant winds in this road are those of the tropic, which may be said to blow generally from S.S.E. to N.N.E., with this variation, that from March to September they approach more from the South (and sometimes even from S.W.) than in the other part of the year. In the latter season they prevail almost without interruption from E.N.E. to N.N.E.

The land breeze, regular in the port, is very light in the road, and is rarely felt beyond the Recife, where the breakers always deaden it; but it weakens or lulls the first wind coming from the offing. The strongest of these, both outside and in the port, are from 10 a.m. until 5 p.m., that is, in all the day during the absence of the land breeze.

The temperature is commonly high at Pernambuco, especially during the night, and until 9 or 10 a.m.: then, after several moments of calm, which are very oppressive, the sea breeze, rising a little, reaches the coast, and refreshes the air, until the moment of sunset. Notwithstanding its heat, the climate of Pernambuco is considered as generally salubrious.

The tides are irregular in the port, probably because the rivers are affected by local circumstances, which increase or diminish the volume of water. The reflux or ebb is, however, perceptible after the sea has ceased to rise, and seems to accord with the lunar influence. The difference of level between high and low water is commonly 6 feet, but it attains 8 feet at the syzigies, and then the strength of the stream in the port is about 2 miles an hour. Under the latter circumstances it is high water at 4^{h} 30^{m} p.m., or very nearly so. In the road the tides are always irregular, and the currents are determined by the prevailing winds at sea.

The variation of the compass near Pernambuco, in December, 1819, was 4° 48′ W., near Cape St. Augustin, 4° 30′. In 1867, at Pernambuco, it is 9° 40′.

REMARKS ON, AND INSTRUCTIONS FOR, PERNAMBUCO, BY A BRITISH NAVIGATOR, 1835.

Under favourable circumstances a ship from the eastward, bound to Pernambuco, should get into the latitude of the lighthouse, or 8° 4′ S. By night the revolving light will be seen, as already noticed. On approaching the coast the lead should be used; soundings may be gained at about the time the land is first seen from the masthead, about 50 fathoms, sandy bottom.

On falling in to the northward of the port, the lighthouse not in sight, care should be taken not to run too far in, or into less than 20 fathoms, until daylight. The town of Olinda, being seated on an eminence, cannot be mistaken. On approaching it in the morning, from the eastward, its appearance is beautiful. Having Olinda in sight, with its churches and other large buildings, the next objects will be the lighthouse, Fort Picao, Fort Bruno, the shipping, and arsenal, in the Port of Pernambuco.

You now bring the lighthouse to bear W.N.W., and run in upon that direction, thus avoiding the Olinda and English Banks. You may anchor in 8, 7, or 6 fathoms, at 1, 2, or 3 miles from the lighthouse, but do not bring this to bear more to the northward than N.N.W., as within this line the bottom is rocky, and there is a shoal at about a quarter of a mile from the reef.

To a stranger approaching northward of Pernambuco, it should be known that the land will appear verdant as far to the northward as *Itamaraca*, and no appearance of white banks of sand. When abreast of the North end of this island three large cocoa-nut trees will be seen to the W.N.W. Olinda may be seen from the mast-head at the same time to the S.W., and the white fort or battery of *Pao Amarello*, at 7 miles to the northward of Olinda. Should the wind prevent a vessel from lying along shore on the port tack, stand off until midnight or morning, as the wind then is apt to blow at right angles with the shore, which will enable her to gain her port.

If falling in to the southward, about Cape St. Augustine, observe that the land is very remarkable, having ten or twelve cocoa-nut trees, on its summit, and reddish banks of sands. There is also a large building among the cocoa-nut trees; but the most remarkable objects about this part are some white cliffs, about 3 miles to the northward of the cape. These cliffs are rugged and craggy, and appear like clothes drying at a distance. Olinda will be seen to the N.W.

Should a vessel fall in to the southward of Cape St. Augustine, a large mountain (*Monte Sellada*) will be seen, having the appearance of a saddle, and also two flat mountains, one on each side of the Saddle Mountain, bearing in a westerly direction.

The chapel on an eminence, *N. S. do Rosario*, with its two towers or steeples, between 7 and 8 miles southward of Pernambuco, has been already noticed.

The HARBOUR.—Pilots are generally in waiting to conduct vessels into the port; but should none be ready, get the vessel (if at anchor) under way about two, or one and a half hours before high water. Should the draught be not more than 16 or 17 feet, the *Small or Picao Channel* may be used. The leading mark through is the two South turrets of Fort Bruno in a line, as shown in Captain Hewett's survey. This will lead within 20 yards of the rock lying to the North of the lighthouse; but as this rock is steep-to, a vessel may luff close round it, and keep close to the reef, if the wind permits, until within a cable's length of the lower tier of shipping; then drop the port anchor, and await the order of the harbour-master or pilots.

Large vessels discharge and load in the channel between the harbour and English Bank, at about three-quarters of a mile to the N.E. of the lighthouse.

Vessels lie moored in Pernambuco with two anchors down, from the side next the town, and also two ropes or chains to the reef. Four vessels generally lie in a tier, and are sheltered by the reef, which is formed by nature, with the exception of a few stones which have been laid down a little above Fort Picao. The water within the harbour is generally smooth, except at the top of high-water spring tides, when there is not only a heavy swell, but also a strong current rushing over the reef. In this case good ropes or chains should be fastened to the reef. This lasts about two hours only at each high water during a few days with spring tides.

On leaving Pernambuco great care should be taken not to stand too near the Olinda Reefs, as there are some detached rocks about the outer edges. The greatest danger of coming in contact with these dangers occurs when leaving the harbour late in the afternoon with a wind which prevents sufficient tacking. In daylight, however, there is little to fear, as the broken water can be seen; but after the first tack night may approach, so that the breakers cannot be seen, and also a strong northerly current, according to the wind, which requires caution. The safest way, in this case is to keep well to the southward.

The marks for clearing the Olinda Reefs in the daytime are the *Camona*, or highest church in the district of *Santo Antonio*, open to the southward of the lighthouse; or rather, the church with two steeples, lying a little to the North of the other, which leads a vessel more clear of them. By night, do not allow the light to bear any more to the southward than W.S.W. until Olinda bears N.W. by W., or W.N.W., when a vessel will be at a good distance off shore.

Banco do Inglez, *Englishman or English Reef.*—The centre of the bank or reef lies about E.N.E. 1½ miles from the lighthouse. The least water found on it was 13 feet at low spring ebbs; the ground very rocky and uneven. In 1855 it was announced that two buoys marked the N. and S. ends of the Englishman Bank; that to the North painted red and white in vertical stripes, and that at the South end a *red* buoy. To clear the bank to the northward keep the highest church in *Boa Vista* open to the northward of the lighthouse. To clear it to the southward keep the southern turrets of Fort Bruno shut in with the lighthouse and Boa Vista church in a line, and the largest cocoa-nut tree at Olinda in a line with an old decayed church, the lowest public building in the town.

This bank or reef is not so dangerous as it has been represented, excepting to vessels of large draught, for when vessels are coming out of Pernambuco it is generally high water, when there is a sufficient depth over it. However, when tacking in the bay at low water the former marks must be observed; as also, when coming to anchor, give it a good berth to the southward, as with strong S.E. winds a very heavy sea sets into the bay. When at anchor too far to the northward a vessel may drive on it before she could be brought up. The sea breaks heavy on the bank with the wind from this quarter, the same as on the Olinda and other reefs. On entering or coming out of the harbour with open boats these breakers should be avoided, if possible, as accidents often occur by the boats getting amongst them.

The pilotage in and out of Pernambuco is very expensive, although the pilots have no branch, yet it is customary for strangers to employ them, and even vessels trading to the port seldom refuse them. They are more serviceable in mooring and unmooring the vessel than in the service which they render in coming in or going out. They have generally a good boat's crew, and some of them are very expert in diving to clear away anything that may be foul of the anchor, a circumstance that often occurs; but there is one charge they make, which is for shifting the vessel down from the discharging berth to that of loading, which could be done without their assistance; still they force their service on you, and under particular circumstances a master is induced to take them.

Vessels loading a sugar cargo in Pernambuco should not load deeper than 14½ feet until they go outside. However, this greatly depends on the wind, for should it be from the S.E. quarter and a good breeze, there is little danger in going over the bar, when drawing 15 or 16 feet, on the height of spring tides.

On leaving the harbour vessels generally begin to unmoor at half ebb, the tide previous to their going to sea, when they have plenty of time to get all their ropes or chains in, and the vessel winded, deck clear, &c. Should the wind be from the S.E. a good breeze, get under weigh one hour before high water, keep at a proper distance from the reef, and make all sail possible; luff close round the rock that lies to the northward off the lighthouse, and observe whether the trees on Cocoa-nut Island, to the southward, open out to the eastward of the lighthouse; if they do, the rocks that lie to the northward of this channel will be passed to windward, then there is only the Olinda Reef to be regarded; but should the direction of the wind be such that these rocks cannot be weathered, which can easily be seen by the cocoa-nut trees not opening to the eastward of the lighthouse (or of the shipping in the harbour), in this case these rocks must be kept on the starboard hand or passed to leeward, and therefore beat through the wide channel, as above directed.

It is to be observed that all these dangers, being to the northward of the lighthouse, are nearly in a direct line with the main reef, so that when the shipping in the harbour are open to the eastward of the lighthouse, a vessel is then clear of them to the eastward, and by having them open to the westward the vessel may run along with safety, passing to leeward of them all. Again, by keeping the shipping in a line with the lighthouse, you would pass on the shallowest part of them.

Should the wind be so that vessels cannot lie along the reef, warping down becomes necessary, and before sail is made they ought to be close down to Fort Picao. Masters, or rather pilots, not taking this precaution, often get to leeward, a circumstance frequently attended with danger, and which is sometimes fatal. This was the case with the brig *Alcides*, which was wrecked in 1832 abreast of Fort Bruno.

When ships are obliged to anchor outside previous to their entering the port, which is generally the case, the masters usually go in with a boat, either to the royal wharf, or else alongside of a visit boat, with one mast and flag, lying inside the reef, a little above the lighthouse. The cargo is generally brought off in boats, or large launches, and attended with very little risk, as the distance is not great and not much swell. From this advantage and the regular sea breeze, the wall formed by nature, and its strong guns for mooring posts, that are proof against any accident that may occur, and the healthiness of the climate, this port may be considered one of the safest and best on the Brasilian coast.

Here it is high water, on the full and change, at 4^h 30^m. The vertical rise of spring tides is 8 feet, and neaps 5 feet. The highest tide is generally two days after the full and change.

II.—PERNAMBUCO TO BAHIA, INCLUSIVE.

Cape. St. Augustin, with its trees, red cliffs, church, &c., have been already noticed. The town of Cabo, on its summit, is a flourishing place. In the bay of Gabu, northward of this cape, there is anchorage within musket shot of the shore, having a passage to it formed by the reefs.

The total distance from Pernambuco to Cape St. Antonio of Bahia, is 376 miles and the mean *true* direction is about S.W. ¼ S. Near the Road of Pernambuco the variation of the compass is 9° 20′ W., but it diminishes to the southward, and near Bahia is only 6° W.

The distance from *Pernambuco* to the *Point Maracahipe* is 30 miles, and the trend of the intermediate coast, *true*, is S. 15° W.

From *Point Maracahipe* to *Porto Calvo* is 44 miles, and the mean direction of the intermediate coast, *true*, S. 27° W.

From *Porto Calvo* to the mouth of the *Rio Sibahuma* the distance is 248 miles, and the intermediate direction, *true*, S. 38° W.

From the *Rio Sibahuma* to the *Point of Itapuan*, nearly on the parallel of the little *Mount Massarandupio*, is 47 miles; direction of the intermediate coast, *true*, S. 44° W.

From the *Point of Itapuan* to *Cape St. Antonio of Bahia*, the distance is 10½ miles, and the mean direction of the coast, *true*, W. 15° S.

From Cape St. Augustin, southward, the coast continues to be fronted by the Recife and other reefs, and without which are gradual soundings to the distance of about 2 leagues. In coasting along there may be found, in 15 or 16 fathoms, good anchoring ground, of white sand; the same ground may be found in 8 fathoms; but in a less depth the bottom is generally of rock and shells.

The POINT OF MARACAHIPE, or MERACAHIPE, 4 leagues to the southward of Cape St. Augustin, is level with the sea, covered with wood, and at a distance appears inundated. When at sea, to the eastward of this point, you will, however, see an inland ridge of high ground, extending North and South, which has a break or dip in the middle, dividing it into two round knolls, and called *Serra Sellada*, or *Saddle Hill*, from its resemblance to a saddle. This mountain stands in lat. 8° 25'. long. 35° 11', and in all the country hereabout a similar one is not to be seen, nor one so high, all others being level, and covered with low brushwood. When just open to the southward of Cape St. Augustin this mount may be seen bearing W. by S. [*S. 69° W.*], and when in a line with Point Maracahipe it bears nearly N.W. by W. [*N. 65° W,*]

From Cape St. Augustin to Point Maracahipe, and still further southward, the land is low, level, and covered with brushwood. The coast has a white sandy beach, bordered with a reef.

Above the Point of Maracahipe is a hermitage, and between Cape St. Augustin and this point are successively the small hamlets of *Maracay* and *Gulinhas*.

The little islet of *Sto. Aleixo* lies in lat. 8° 35' 49", nearly off the entrance of the little river of Serenhaem; at 1½ leagues to the southward of which is another little river, *Rio Fermoso*. There is ne passage between it and the land, near to which it lies. To the N.W. of the islet, and at several leagues inland, may be seen the Serra Sellada, above described: at several miles to the East of them Cape St. Augustin may be distinctly seen, as it bears from them N. 18° E. *true*, 15 miles.

Tamandare.—At 7⅓ miles to the S. by W. from the islets of Sto. Aleixo is the little *Port Tamandaré*. It is against an opening in the reef which forms an anchorage, and which is larger than most of the openings of this nature. The space and the depth are sufficient for large vessels, and the coasters say it will accommodate three are four frigates. The depths are from 4 to 6 fathoms. A fort on the coast defends the entrance and interior anchorage. The entrance to it is with the fort bearing N. by W. 1¾ mile distant. The position of this fort is lat. 8° 43' 24", long. 35° 2' 35".

The roadstead of Tamandaré is the best place for shelter between Pernambuco and Bahia, yet it is exposed to all winds of the segment from South to N.E. by E., and vessels are not protected from the sea by the reef; for it, in several places, is very little above the level of the water.

In proceeding along the coast, from N.E. to S.W., you pass successively before the bars of *Camaragibe*, *St. Antonio*, and *St. Antonio Mirim*, which admits jangadas only. On the parallel of 9° S. is the *Barra Grande*, and in 9° 11' *Port Calvo*, where rivulets facilitate the transit of goods, but have no depth at the entrance.

Porto de Pedras, or Calvo, is small, but will admit vessels of 120 tons, and may contain six of that description. The town of Porto Calvo is now a small place with large houses, and a *city-like appearance*. It suffered much in the rebellions, and contains about 2,000 inhabitants. It still carries on some trade. Along the coast, at the distance of about half a league, is a ledge of reefs, having an interval which constitutes the entrance, and which has a depth of 5 and 6 fathoms. Within is a depth of 3 and 4 fathoms. Strangers must cautiously proceed with the lead, and will find, when within, that the water is smooth, with bottom of sand.

The name of BARRA GRANDE, given to an inlet situate to the N.E. of Porto Calvo, as shown on the chart, may induce a stranger to suppose that it is a fine harbour. We have, therefore, to notice that it is only 3 fathoms, with reefs to seaward, and a flat rock, covered with water. Its distinguishing mark is the high land of St. Bento, on the South side, and above it the church of St. Bento.

From PORTO CALVO to the RIO CAMARAGIBE, 3 leagues to the S.W., the land is level, with low brushwood; the reefs half a league from the coast; the beach of white sand. On the South side of the Camaragibe, stretching along shore, is a range of bare hills, or cliffs of red sand.

Near the river St. Antonio-mirim (or little St. Antonio) is a range of red cliffs, half a league in length, and three small round hills, which stand on its northern side.

MACEIO, or Macayo.—The next place of any consequence on this coast is MACEIO, or MAÇAYO, a city or village situate on the western side of a wooded bluff. It is the capital of Alagoas. Here the shore trends in an East and West direction, and upon it, to the South of the village, is a small fort near the mouth of a rivulet; before it is an open roadstead, protected on the East by reefs of coral, but which are covered at high water. The place has been surveyed by Captain the Hon. F. F. de Roos, R.N., who places the fort in 9° 40′ S., and 35° 41′ W.

There was a powder magazine on the wooded bluff East of the town, which was white, and was seen at 4 leagues off; but it is superseded by the lighthouse. On advancing nearer the church will be seen. The anchorage is good in 5 fathoms, sand and clay, with the town and lighthouse nearly in a line, and bearing N.N.W. at three-fifths of a mile from shore.

A Lighthouse was completed on July 1, 1856, on the western point of the hill which overhangs the city of Maceio, on the spot where the powder magazine formerly stood. The light is elevated 208 feet above the sea, and should be visible in clear weather at a distance of 22 miles.

It is a bright fixed light, varied by a brighter flash every 2 minutes; the flash of 12 seconds being preceded and followed by short eclipses of 16 seconds duration.

The outer point, East of Maceio, is the *Ponta Verde*, or *Green Point*, which is covered with cocoa trees, with breakers over its rocky extremity. To those approaching from the N.E., Maceio is hidden by this point; but on rounding the reefs to the westward it comes in sight. At a mile from all this coast are found 10 fathoms of water, bottom of madrepores, and the depth appears to increase gradually to the distance of 4 to 6 leagues, where there are from 25 to 30 fathoms; and in fine weather a vessel may anchor on almost any part of the bank.

To the northward of Maceio, far up the country, are seen the *Serras de Marambaya*, a chain of mountains discernible at 15 leagues off, and are conspicuous over the adjoining land, which has no distinguishing mark. The country here is very fine; the coast generally of sand, frequently covered with cocoa-nut trees, and small portions of a steep, reddish shore. The middle of the mountains of Marambaya is in lat. 9° 25′.

The village of *Juragua*, amidst cocoa-nut trees, occupies the shore from the Fort of Maceio, above mentioned, to another fort at the distance of a mile to the East. The coast between forms a curve, and is very low. At a mile to the southward of the eastern fort is a *Baixo*, or detached shoal, which breaks with a high southerly wind. Good water may be obtained here.

It is high water here, on the full and change, at $4^h\ 30^m$. Spring tides rise 8½ feet. Variation of the compass, 4° West, 1832. In 1867 it is 8¾ West.

The port of Maceio is protected by a reef of rocks, visible at ebb tide. The beach within it forms a semicircle of white sand. Immediately back from the beach are a row of white houses, with here and there groves of coqueiros, bearing fruit. Upon the hill above stands the city of Maceio, with a population of about 3,000. There is not a convenient landing-place in its harbour.

The exports of the province of Alagoas are chiefly sugar, cotton, hides, Brasil wood, and rosewood. Sugar, in large cases, is brought from the interior, upon rude carts, drawn generally by six or eight oxen. The cotton comes in bales of about 180 pounds each. Of these a horse carries one on either side of a pack saddle. Mules have not yet been introduced into this region as beasts of burden, although it is thought that they would be more serviceable than horses. Of late the greater proportion of the productions of the province has been exported by way of Bahia and Pernambuco. Formerly foreign shipments were more frequent, and a greater number of foreigners resided in the place.

The following remarks on the port of Maceio are by the Hon. H. F. de Roos :—

"On approaching Maceio, when at the distance of 12 or 14 miles, a small white building can clearly be made out. (This is now the site of the lighthouse above described.) The land may also be distinguished by a red spot on the face of the cliff, about 5 miles to the south-west, and by a white chapel, with two towers, in the samo direction; moreover, Mount Barriga, at a distance in the interior, may be observed. It stands alone, and is higher than the land which forms the coast, but is otherwise not remarkable.

"Maceio, being the only convenient anchorage between Bahia and Pernambuco, enjoys a considerable commerce, and has an extensive communication with the interior. Many English vessels annually touch here. Supplies are to be had at a moderate rate, and excellent water can be obtained in the adjoining harbour of Paijucara, at a well near the beach.

"The port is formed by the point of the Barrier Reef terminating abruptly, which extends along the shore here, a sandy beach, forming the continuation of the coast for some miles to the southward. It is an open bay, but affords protection from the prevailing winds, which blow from E.N.E. to E.S.E. throughout the greater part of the year.

"The men who fish in the jangadas, or sailing rafts, which are constantly to be met with on this coast, are good pilots; but there is a regular harbour-master at the village of Juragua, who will come off to bring ships, on their firing a gun.

"The anchorage of H.M. sloop *Algerine* was in 5½ fathoms, the end of the reef bearing S.E., and the covered wharf, or trapiche, E. 58° N., by compass. From this anchorage the sea is open from S.E. to S.W. ½ W., bottom sand and clay; a quarter of a mile in the direction of trapiche are moorings laid down for the trading packets from Pernambuco and Bahia, which call every fortnight.

"Persons acquainted with the port generally approach it, keeping within a quarter of a mile of the reef, and in this manner rounding the point; but strangers are not recommended to do this, as the soundings are irregular, and the Baixo, with only 15 feet of water on it, is to be avoided. The safe rule is not to bring the lighthouse to the eastward of North till you have passed the point of the reef; you may then haul into your anchorage.

"In the nine summer months this port may be deemed safe, but in June, July, and August, when the southerly winds prevail, it is very much exposed. No English merchant vessel has ever been wrecked here, though one brig, not long since, drove and bumped her rudder to pieces in a southerly wind. Instances of Brasilian wrecks frequently occur.

"There is an adjoining harbour (to the East), formed by the same reef, called *Paijucara*, which affords shelter to small vessels only. It is shaped like a basin, the entrance being near the centre. It is very shallow, and seldom used, as with the wind to the northward of N.E. a vessel cannot fetch in. One corvette and two brigs of war have been built in Paijucara."

In some remarks on Maceio by Captain Drinkwater, R.N., it is noticed that the land to the northward is of moderate height, abounding in red cliffs. H.M.S. *Doris* anchored in 8 fathoms, rock, and broke the anchor in heaving up three hours after. A little further in the bottom is clearer, as seen by the sludge. A swell sets in continually.

S. Miguel de Alagoas.—The bar of *Sao Miguel das Alagoas* (of the lakes) is the mouth of small river which comes from the N.W., and on the northern border of which is the little town of *Sta. Anna.* It is under this town that the coasters go to take charge of the sugar, cotton, and building wood produced in the country, and brought from the adjacent heights; several roads for the conveyance of which may be seen.

The Bar of S. Miguel admits very small vessels only. The same is the case with *Porto Francez,* a small anchorage at about 2 leagues more to the North against the hamlet of *Remedios,* and at the base of the *Point Massaveiro,* forming the South side of a large valley occupied by the Rio das Alagoas, and by the two lakes which give their name to that river. Craft drawing 6 feet water may enter Porto Francez, the only point of communication from the lakes to the sea. The larger coasters stop in the exterior anchorage for receiving, by the jangadas, the merchandise of the country.

The coast southward of the Rio de S. Miguel should be approached with great caution, as there are several detached shoals, which lie at from 1 mile to 1½ mile off shore. Do not come into less than 10 fathoms.

Jiguia, or Jiquia.—At 5 leagues to the south-westward of Rio S. Miguel, in 10° 3′ S., is the Bar of Jiguia. The coast between is about 80 feet in height, nearly horizontal, and terminating on the sea by several reddish cliffs; the interior, which is woody, presents an agreeable aspect.

The *Bar of Jiguia* is not always navigable for the coasters, and they more frequently anchor outside; but, with high tides, it allows the passage of the smacks, of 80 tons, built from the abundant wood produced on the sides of the river.

On proceeding *southward* from Jiguia you pass the mouth of the little *River Poxim,* on which is the village of *Conceiçao,* and at the distance of 9½ miles thence is the bar of *Coruripe* or *Cururippe.* A village of the same name stands on a low projecting point, with cocoa-nut trees. At this part the recife appears at from 1½ to 2½ miles from the beach. At 1¼ mile outside the reef, that is, at 2¾ miles from the extremity of the point on which Coruripe stands, is a very dangerous cluster of reefs called *Dom Rodrigo.* There is a passage within of 5½ and 6 fathoms, three-quarters of a mile wide, in which a ship might find shelter under the lee of the reefs. At 3 miles S.W. from this is another shoal, the *Lages de Miahy,* 22 feet least water; and at 3 miles beyond, in the same direction, is a 7-feet shoal, called the *Baixos do Japú.* The two last are 3 miles off shore. On the other parts of this coast you may approach to the distance of 2 miles, where there is generally from 10 to 13 fathoms of water.

The RIO SAN FRANCISCO is a broad and rapid river, but shallow, especially at its entrance. It is subject to great inundations in the months between September and March. Small craft only can enter it, partly owing to the rapidity of its stream, and partly to the shoals at its entrance. The North point, at the mouth of the river, is situate in lat. 10° 28′ 10″, long. 36° 19′ 40″.

The intermediate land between the Alagoas and Rio San Francisco is low and sandy; the shore, bordered by the Recife, presenting small openings and inflections, known to the coasters only.

The entrance of the river is bordered on the South by the point Manguinha, a low flat point covered with mangroves. It projects to the E.S.E., and heavy breakers extend seaward 1½ mile. The North point, also very low, is of quicksand, without vegetation; the coast northward of it is of the same nature, and there are breakers as on the South. The passage in is between the breakers, and vessels anchor before it in order to engage a pilot, whose assistance is indispensable.

According to the pilots, the mouth of the river has a depth of 12 or 13 feet at high water. The country here is very populous, and abounds in sugar, cotton, building wood, tobacco, &c. The most considerable town of the vicinage is one called *Penedo,* 24 miles from its mouth.

The Rio de San Francisco takes its course near the Villa Rica, about 80 leagues to the W.N.W. of Rio Janeiro; it is one of the largest rivers in Brasil, and is described as navigable in the greatest part of its course. It extends from the South to the North, in nearly a parallel direction with the coast; but, traversing a flat country to the approaches of its mouth, and loses both depth and strength. It has been excellently surveyed throughout its course by order of the enterprising Emperor of Brasil.

"To reach the vast interior provinces of Brasil through the navigation of the River San Francisco, is the desideratum aimed at by the three principal ports of Rio de Janeiro, Pernambuco, and Bahia. The former is surrounded, and shut in by lofty mountains of from 4,000 to 6,000 feet, and has not hitherto succeeded in finding an easy outlet for his railroads into the interior to reach the San Francisco through the province of Minas Geraes. The second has a long way to go before she can reach that river, of the margins of which she only possesses a few leagues. But Bahia has been destined by nature, and the topographical features of her territory, to become mistress in time of that internal traffic, and moreover possesses 168 leagues of that splendid internal artery of the empire on both margins of her territory."—*Mr. Morgan*, H.B.M. Consul, Bahia, March, 1859.

At about 2 leagues to the W.S.W. from the mouth of the San Francisco may be seen a small opening on the shore, called by the country people *Barra Nova*. There is a discharge from the river during the wet season, but even then it is not navigable.

From the Rio San Francisco, to the S.W., the coast continues to be very low; but we now come in sight of the great inland mountains *Pacatuba* and *Itabayanna*; the latter being to the West in about 10° 50′ South, and its highest summit is stated to be in 10° 47′ 10″ S., long. 37° 23′.

Here it becomes dangerous to approach too near the shore, as with a strong south-easterly wind it would be difficult to gain an offing. The beach is flat, and the bottom near it of stiff sand, in which the anchors hold firmly; but this should not induce a vessel to come too near. At the distance of between 3 and 12 miles from land the depth increases to 26 fathoms, with the exception of a spot 6 miles to the South of Rio Francisco, where 36 fathoms have been found.

The RIVER COTINDIBA, which winds far up into the country between the mountains, lies near the parallel of 11° South. At a short distance within its entrance it receives the waters of several smaller rivers; it is much frequented by the coasters for the products of the country, as sugar, cotton, tobacco, &c.

When you have brought the bar to the West, you will descry the Mount *Aracaju* at several leagues to the N.W., and to the West is the high land called the *Morro de Telha*. The first is remarkable from its form in the direction of the coast, with a cut or opening at its northern extremity: the second is in the form of a *cardinal's hat*.

MAROIN or MAROUIM is a port on the River Cotindiba or Cotinguiba, the entrance of which is in about lat. 11° S., long. 37° W. It was generally supposed that there was not more than 6 to 7 feet on the bar of the river; but in 1848, the following notice was issued:—

The bar of Cotinguiba River is in lat. 10° 58′ or 10° 59′ S., and vessels making the port should keep well to the North of the bar, as during the shipping season, from October to April, there is a very strong N.E. current down the coast. Vessels may close with the land until within soundings of 5 or 6 fathoms, when they will be 2 to 3 miles from she bar; and they should then hoist a signal at the fore for a pilot, who will proceed on board as soon as the tide turns for the ebb.

When in sight of the signal-post from the ship, the signals should be observed, as they are intended for a guide to vessels entering the port; and of their purport the following is an explanation:—

1st. The upper flag hoisted alone is the signal that the vessel is seen from the shore.

2nd. The lower flag, which is hoisted upon a moveable staff, denotes that the vessel should tack, either to the North or to the South, as indicated by the direction of the sloping flagstaff.

3rd. Both flags being hoisted on the central flagstaff, one above the other, signifies that the vessel is in the right position off the bar, and that the tide is favourable for entering. The vessel should then steer direct for the signal-post on the beach, and the signals will remain flying even after the vessel has passed the bar.

4th. If either one or both of the flags be hoisted and lowered again, it implies that the ship should stand off.

If the master of a ship has never been in the port before, he should not attempt to enter without a pilot, and should avail himself of the telegraph only in case of absolute necessity.

Long before the signal-post is visible, there is a chain of mountains that may be seen in clear weather. It is named La Itabayanna, and is so denominated in the English charts. Its southernmost point is named, from its similarity in shape, the Cardinal's Hat, and bears from the bar W.N.W. ½ W.

Coming from the northward, there may be seen a distant and solitary hill named Aracaju, at the entrance of the river, which, when the vessel is about 2 or 3 miles E.S.E. of the bar, bears W.N.W. ½ N.

Coming from the southward, the bearings will be nearly the same, but great care must be taken not to enter the River Vazabarris, where the signals are very similar, and which is only 14 or 15 miles to the S.W. of the Continguiba bar. The bearings of the Cardinals Hat from the Vazabarris are N.W. ½ N., and the Aracaju is not visible.

There is a good anchorage to the North of the bar, in 6 or 7 fathoms, hard firm sand; but vessels should, if possible, always remain under weigh, and though they make the port too late for the pilot to come off that night, still they should hoist the signal at the fore, and stand out to sea, keeping well to the northward, where they will be sure to meet the pilot outside in the morning.

Vessels coming either from foreign or Brasilian ports, should be very particular in being provided with all papers required by the authorities in any Brasilian port, as the custom-house is very strict, and the default of such, the usual fine will inevitably be levied according to the custom-house regulations.

The pilot-boat is a fore and aft schooner.

The depth of water in the channel on the bar is about 16 feet at spring tides, but as the vessels cannot get under way from the anchorage before the ebb bgins, and as a good deal of time may be lost before they reach the bar, they ought not to draw more than 11 feet.

Vasabarris, or RIVER of SERGIPE.*—The Bar of the Vasabarris, or River of

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* The PROVINCE OF SERGIPE DEL REY derives its name from the River Seregipe, an aboriginal name, on which St. Christovao, the capital, was first established, but removed afterwards to another situation. Its conquest and colonization were commenced in 1590, and was granted to Christovao de Barros, the deputy governor of Bahia, as a reward for his services in reducing the natives. Having less natural advantages for commerce, this province has not made the same progress as the other maritime captaincies. Along its coast there are no capes, islands, or good ports. Its rivers have bars which are generally more or less dangerous, and afford little shelter, except to small vessels. The surface of the province is generally flat, there being scarcely a hill or mountain of any considerable elevation. The *Sierra Itabayanna*, between the Rio Real and the Vazabarris, which, though more than 20 miles from the coast, is visible at a great distance from the sea. Valuable Brasil and other woods grow on this serra. Cazal divides the province into eastern and western. The former, in consequence of its woods, is called *Mattas*; the latter, which includes the larger portion of territory, has acquired, from the sterility of its soil, the denomination of *Agrestes*. The eastern part of the province yields sugar and tobacco, and the western is chiefly devoted to rearing cattle. A few *aldeias* on the River San Francisco, its northern boundary, are the

Sergipe, is 14 or 15 miles south-westward from that of the Cotandiba. When advancing to this place, from the East or the South, you may see three small hills, of equal size, covered with bushes, situate about 3 leagues to the S.W. of the entrance and which are named *os Tres Irmaos*, or the *Three Brothers*. The town of Sergipe, built at the foot of these hills, on a conflux of this river, has given its name to the stream.

The mouth of the river is formed on the South by a long point of white sand, and is, as well as the North point, encompassed by violent breakers, which render an entrance into it very difficult. Under the most favourable circumstances the channel has only 10 or 12 feet of water. The South point of the entrance is in lat. 11° 10′ 30″, long. 37° 9′.

Rio Real.*—The mouth of the Rio Real is 7 leagues S.S.W. from that of Vasabarris. This is a river which proceeds, in a long course, from the interior, and inland is divided into many branches. Seen from the offing, the mouth presents nothing remarkable, but the breakers on each side. A strong current sets outward from the river.

The southern point, called *Mango Secco*, is an extenson of a beach of white sand, called by the pilots the *Prancha*, or Plank of Rio Real. Within the bay the river turns to the S.W., and afterward receives a number of others. From sea, at about 2 miles off, are seen a number of huts in the environs of the bar; over the latter there are said to be only 15 feet of water, with high tides. The swell is heavy, and the passage always dangerous, and to be attempted only by the boats and pilots of the country.

All the coast extending from the Rio St. Francisco to the Rio Real is low, sandy, partly covered with bushes, and variegated with little woody hills. The ground without the Recife, or line of rock, is generally clean, and between 2 and 10 miles off the depths are from 9 to 30 fathoms, bottom of oaze, sand, and broken madrepores. The last quality of bottom is generally the furthest from shore.

Itapicuru.—At 7 leagues S. 30° W. (*true*) from the bar of the Rio Real, is that of the Itapicuru, which is of less consequence. According to the pilots it has only 7 or 8 feet over it with high tide, and it is obstructed by breakers, which render an access dangerous; no distinguishing marks being seen from the offing. On bringing it to the West the opening may be seen between downs on the right and left, and there is a hamlet on the South side at some distance within the entrance. The only vessels which enter are the decked boats and jangadas or rafts of the country, which are insubmersible.

From the *Bar of the Itapicuru* the coast trends in a more southerly direction to and beyond the parallel of 12°. A series of small hills, called the *Oiteros de San Miguel*, borders the coast, commencing at 6 or 7 miles from the Bar of the Itapicuru. Nothing remarkable is seen on the coast for a distance of nearly 20 leagues, except the little mount *Massarandupio*, in 12° 24′ S., eastward of which several rivulets

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most cultivated spots. In the eastern part four settlements have been named towns, besides Sergipe or St. Christovao, which, being the capital, ranks a city. It is situated on an elevation near the River Paramopama, an arm of the Vazabarris, 18 miles from the sea. But the most populous and the busiest settlement in the whole province is, or was, some time ago, the *povoacao* of Estancia, 5 leagues from the sea, on the River Piauhy, which falls into the Rio Real, by which sumacas ascend to it. None of the rivers are navigable for large vessels, and the entrances of all are dangerous.

* The PROVINCE of BAHIA, including the old captaincy *dos Ilheos*, extends from the Belmonte to the Rio Real, which divides it from Sergipe del Rey, being about 300 miles in length. On the West and North-west it is separated by the River San Francisco from Pernambuco; while on the south-west it bounds on Minas Geraes. It is divided, like Pernambuco, into the comarcas of Bahia, Ilheos, and Jacobina, the former two comprising the coast, and the latter the western part of the province.

fall into the sea. Along the greater part of the coast are the reefs, and a strand of white sand.

In the bay formed by the coast between the Rio San Francisco and the Rio de Sergipe, the sea, in all seasons, rolls violently inward; and more particularly when the wind sets in upon the coast. Many ships have been lost here; and, as it is so dangerous, all who pass should keep off to a sufficient distance.

In lat. 12° 32½', long. 37° 58½', is the tower of Garcia da Vila, the most remarkable object of this part of the coast; it is a sort of fort, on the rising land, situate among trees, and having a signal post. All the shore may be approached to the distance of a mile, in 11 to 14 fathoms, bottom of sandy oazo and broken madrepores or coral. The depths increase quickly, and at 10 miles off there is no bottom at 40 fathoms. In lat. 12° 30' no bottom is to be found at 60 fathoms, 8 miles off.

From the tower of *Garcia da Vila* the coast trends S.W., to the point of *Itapuan*, on an extent of 11 leagues, and presents nothing but sandy downs, varied only by bushes and cocoa-nut trees. The Recife, or border of rocks, continues all the way, and many are always above water, appearing like islets; those, in particular, about Point Itapuan are seen detached from the coast. In this parallel, lat. 13°, at 12 miles off no bottom is to be found at 100 fathoms.

The *Baron Roussin* says, that on all the extent of coast between the parallels of 10° and 13° we have found that the winds of the northern monsoon have daily variations, a knowledge of which is useful to those bound northward. During the night the land breeze ceases; but this is seldom felt beyond the reefs. On the approach of day, however, the breeze freshens and blends with the winds of the offing, which seem attracted by the North coast toward noon: after this hour the wind becomes more easterly, so as to make an angle of about two points of the compass between that of the morning and that of the evening. It follows that the borders are affected by these varieties, of which advantage may be taken.

BAHIA DOS TODOS OS SANTOS.

From the *Point Itapuan* the coast trends nearly W.S.W., 11 miles to Cape St. Antonio at the entrance of *Bahia*, or the *Bay of All Saints*. This cape is distinguished by a light-tower, hereafter noticed. At 2½ miles, East several degrees South, from the light-tower is another point, on which is a lookout and signal station; this point is the southernmost of the promontory of Bahia, and it forms, with that called *Itapuanzinho*, at a mile more to the East, a small bay or cove, occupied by an armaçao, and defended by the rocks. Some habitations are remarkable on the East coast about the cape, but landing is difficult. Here the Recife, or border of reefs, terminates.

BAHIA.—Bahia dos Todos os Santos, the Bay of All Saints, was discovered in 1503, by Americus Vespucius, under the patronage of the King of Portugal, Don Manoel. Vespucius carried home from the coast of Santa Cruz, as the newly discovered country was first called by the Portuguese, a cargo of *ibiripitanga*, the dye-wood, which, when cut in pieces, resembled *brazas*, coals of fire; from which circumstance it acquired the name of Brazil-wood, and also conferred a name on the country.

In 1510 a vessel under the command of Diego Alvares Correa was wrecked near the entrance of this bay. The Tupinambas, a ferocious tribe inhabiting the coast, fell upon and destroyed all who survived the shipwreck, save the captain of the vessel, Diego, whom they spared, as some supposed, on account of his activity in assisting them to save articles from the wreck. Bahia owes to this event its foundation, and its being long the capital of Brasil.

The entrance of the Bay of All Saints is formed, on the West, by the Island Itaporica, and on the East by the peninsula, on which stands the City of St. Salvador, or of Bahia. Within it the land forms an extensive gulf or inland sea, bearing the name of *Reconoavo*, and which receives the waters of several large rivers. The entrance of the bay is 7 miles broad, and the gulf within more than 32 leagues in circumference. Here fleets, riding on clear ground, may be sheltered from every wind, and surrounded by a country exuberantly rich, in a gulf which seems as if formed by nature for the emporium of the universe.

On the site of the former lighthouse, the Fort Santo Antonio da Barra, and at about 140 feet above the level of the sea, is a revolving light, showing two brilliant white sides and one red; the latter to be seen once in every four minutes. The lights are visible from the distance of 25 to 30 miles.

Bahia, or San Salvador de Bahia, stands on the western shore of the Bahia de Todos os Santos, which extends 28 miles from South to North, and 20 from East to West. The bay has two entrances on both sides of the Island of Itaporica, of which the eastern is about 5 miles wide, and is used by large vessels; the western, called Barra Falsa, is only 2 miles wide, and, owing to its shallowness, can only be navigated by coasting vessels. The best anchorage is opposite the town of Bahia. The town consists of two parts, the Praya, or Citade Baxa, and the Citade Alta, which has the aspect of an old city. The lower town, the Praya, is built on a narrow strip of land at the foot of a perpendicular cliff of from 200 to 240 feet elevation, and, with the exception of some good houses on the quays, the place is pre-eminently foul and disagreeable. It is shut out from the sea breeze by the cliff above it, and in the afternoon the heat is almost insupportable. Nevertheless yellow fever was unknown till 1850. The Praya (beach) is one street, nearly 4 miles long, and contains the magazines and warehouses for inland produce and foreign goods. At its southern extremity are the arsenal and the royal docks, and about 3 miles north-east of it, at Tapagipe, the ship yards in which mercantile vessels are built. A steep and very difficult ascent leads to the Citade Alta. The upper town consists of stone houses from three to five stories high, and of a good appearance. In the centre are several squares, surrounded principally by public buildings. The cathedral, the old Jesuits' college, now a hospital, and numerous churches, are the chief public buildings in the upper town.

The custom-house and wharfs are on the beach, as is the dockyard. Near the latter are the marine storehouses and offices, with the house of the intendant, or port commander.

The official census of 1861 gave the population of Bahia thus:—Whites (Brasilians or Portuguese), 40,000; Mulattos, 51,000; native Negros, 33,000; Africans, 25,000; Foreigners, 3,000; Total, 152,000.

The town and shipping are protected by a number of forts and batteries. The first is that on Cape St. Antonio, a small antique fort, surmounted by the light tower. A little bay and sandy beach within are defended by a small fort called *Fort Cabo*, or *Santa Maria*, and the circular battery of *St. Diego*. At the S.W. extremity of the city, that leads to the sea, is *Fort Gamboa*, carrying eighteen 24-pounders. Passing this, the dockyard is defended by the high bulwark battery of St. Philip, which mounts about thirty guns. There are three other insignificant batteries on the inhabited part of the beach, and a small one on the projecting point, more to the North, called Montserrat. On the land side the city is defended by three forts, &c.

The principal defence, however, is the *Fort do Mar*, which was erected about the year 1600, on a small rocky bank of the inner bay, about one-quarter of a mile from the shore.

The flagstaff of this fort stands in lat. 12° 58′ 23″, long. 38° 30′ 37″. High water, on the full and change, $4^h 15^m$. Spring tides rise 7, neaps only 3 feet. The tides are perfectly regular. At the anchorage before the town the flood and ebb are equal, and their direction is alternately N.N.W. and S.S.E.; their strength, under ordinary circumstances, does not exceed 1½ mile in the hour, but spring tides sometimes run as much as 2½ miles.

The Fort do Mar, or Sea Fort, otherwise called *Fort San Marcello*, repeats the signals of all vessels entering the port, which are first made at Fort St. Antonio. They are announced by a gun, with a tri-coloured jack for the three-masted vessels, a red one for brigs, and white foi smacks.

Ships, on arrival in the bay (men-of-war excepted), must deliver up all their gunpowder, to be deposited in the Fort do Mar, during their continuance in the harbour.

At the imperial dockyard ship-building proceeds very slowly, as it admits only one ship of the line at a time; but at the several yards of Tapagipe, north-eastward of the city, well-modelled merchant ships of all dimensions are built, and with greater despatch.

At about a mile from the city is the suburb of *Vittoria*, where Captain Sabine made his observations in 1822, and which he states to be in lat. 12° 59′ 22″, on a sandstone cliff, which descends abruptly about 200 feet to the sea. The great road by the coast to Pernambuco, and generally toward the northward, passes through the village.

Iaguaripe, Amoro Jacobina, Do Sitio, and San Francisco, are all bustling towns of the province. The country in general is cultivated inland to a considerable distance, and is divided into very extensive plantations.

REMARKS FROM M. ROUSSIN, 1819.—Ships will find at Bahia the means of providing for all their wants; they may careen, remast, and repair all sorts of damage; but the workmanship is very dear, and the port dues extravagantly high, as in the other large ports of Brasil.

In the fine season all kinds of repairs may be made at the anchorage West of the town; during the other part of the year it will be more prudent to make them at Tapagipe, in a little bay situate to the eastward of the peninsula of Montserrat, where the water is smooth as in a basin.

There are good watering-places at many points of the interior coast of Bahia: water is easily obtained, either near the Fort Gamboa (South of the town), under the public garden, or at some distance to the northward of the marine arsenal; but when a number of ships cause a great concourse of boats, it will be better to go to Tapagipe for water, if required in a great quantity.*

SAILING DIRECTIONS for BAHIA.—Cape St. Antonio Lighthouse, at the entrance, is placed by the Baron Roussin in 13° 0′ 44″ S., and 38° 31′ 28″ W. Capt. Sabine, in 1832, gave the long. as 38° 33⅓′, but other authorities have given it more to the eastward, and the mean appears to be 38° 32⅓′ W.

Of the principal entrance to Bahia the narrowest part is 4⅓ miles broad, but only one-half of that space (on the eastern side) is navigable for large vessels, owing to ledges of rocks and uneven ground extending from the East and S.E. sides of Itaporica, and which should not be approached to less than 8 or 9 fathoms.

On the eastern side, without this entrance, is the Bank of San Antonio, the other extremity of which is 4⅓ miles S. ⅓ E. from the Cape of San Antonio. This bank is composed of red sand, mixed with coral. It is of an irregular shape, but is narrow in proportion to its breadth, and it extends nearly North and South. The least depth on it is about 13 feet at low water. As the sea sometimes breaks over some parts of it in strong winds, it is always best to pass outside of the above distance in a large ship. The depth of 7 fathoms limits this bank on the South in the parallel of 13° 5½'. It was re-examined in 1864 by Capt. Garnier, of the French frigate *Galatheé*, when but little change was found from the survey by Admiral Roussin.

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* I must again call the attention of ship-owners to the fact of several ship-masters trading to this port carrying on a petty smuggling trade on their own account, which seriously compromises the interests of their owners, and of the flag in general. Several British vessels were fined during the last year on this account, which has given rise to so severe a fiscalisation as to be extremely tiresome, if not oppressive, to those who are innocent of smuggling. Up to a certain period the credit enjoyed by British vessels in this port secured to them privileges on the part of the fiscal authorities which was not enjoyed by other flags; but since the discovery of these illicit transactions, that confidence which was formerly reposed in British shipmasters has been withdrawn.—Reported by H.B.M. consul at Bahia, Mr. Morgan, March 15, 1859.

Between this bank and the shore is a channel having a depth of 10 fathoms, with muddy bottom, and frequently used; but it is to be observed that, in going in, the wind almost always allows a vessel to fetch the anchorage before the town by one board, on passing to the southward of the bank. At 1 or 2 miles to the eastward of the southern point of the bank the depth is regular, from 35 to 20 fathoms, and which may be carried close to it.

Small vessels usually cross the bank, but this is dangerous with a fresh breeze, especially from South, which causes a very heavy sea on it.

The bottom, in the vicinity of the bank, is a mixture of sand, coral, and coarse gravel. Mud is found in the N.E. only, on approaching the land. At 3 leagues from the coast, with Cape Antonio bearing North to N.N.W., the depth is not more than 40 fathoms; and a little further off, in the same direction, no soundings have yet been obtained.

The southern extreme of the San Antonio Bank is passed when Mount San Amaro, which is the highest hill on Itaporica Island, is in line with the hill just behind Point Conceiçao, bearing N. 70° W. You will be to the westward of the South end of the bank when the lighthouse bears to the East of *true* North, for the meridian of the lighthouse nearly touches the western edge of the bank. When Montserrat Point opens with Point San Antonio you are quite in the channel; this is the usual mark for turning northward for the anchorage. A closer mark is the lighthouse, on with a convent on the summit of a hill at three-quarters of a mile N. ¾ W. from the lighthouse. This bearing passes half a mile West of the bank.

On the western side the principal channel is bounded by the Prapatingas Reefs, which project 2 miles off the shore of Itaporica, and continue throughout its length, as far as Barra Iaguaripe.

The limits of the channel are well marked, both by the soundings and by marks. In beating in, about ship immediately that 5 or 6 fathoms is found on either side, as the banks are steep. A turning mark for the eastern side is Point San Antonio on with the church of Bomfim de Montserrat, and on the West, tack when you are from 2 to 2½ miles from the Itaporica shore, which you may know by bearings of the N.E. point (Jaburu) of the island, and the other chief points in sight. You must be particularly careful when on the parallel of the lighthouse, as the shoals here contract the channel on the West side more than elsewhere.

The INNER CHANNEL, that is, the one North of San Antonio Bank, may be taken in coming from the N.E.; as soon as you have doubled Point Itapuazinho, at 1 or 2 miles distant, keep the coast on board at less than a mile off in depths of from 12 to 14 fathoms, and steer for the lighthouse so as to pass 3 or 4 cables' lengths South of it, and as soon as it bears N.N.W. you are inside the bank. Remember that the head of the San Antonio Bank, with only 3½ fathoms, bears S.S.E. ½ E. three-quarters of a mile from the lighthouse.

At the ENTRANCE of the HARBOUR the depths are from 14 to 16 fathoms within half a mile of the eastern shore, whence it deepens to 18 or 20 fathoms westward, until about two-thirds across, further than which heavy ships ought not to stand. To the westward of this are overfalls, shoaling from 14 to 6½ fathoms, then deepening again to 12; and in some places, at 2½ miles from Itaporica, there are no more than 3 fathoms.

On the eastern part of Itaporica the Prapatingas *reefs* extend about 2 miles from shore; and, at about a cable's length without them, the depth is 6 fathoms; it thence increases quickly to 12, 18, 24, and 26 fathoms, soft muddy bottom, and in the midway over is more water: from this, in an easterly direction, the depth gradually decreases to 12 fathoms, at 1 or 1¼ mile from Fort do Mar.

The Reconcavo, as the inner bay is called, is a noble basin, 30 leagues in circumference, with a band of most fertile land encircling it, with a breadth of 30 or 40 miles. At least a thousand coasters and boats are employed on this magnificent bay in transporting the produce to or from the numerous rivers which fall into it, or the towns and villages to which they give access.

It is on the eastern side of the entrance to this Bahia dos Todos os Santos that the city lies, and which also forms the harbour itself. Except the reef encircling Itaporica Island it is clear on the West side, but on the eastern side there are some dangers which require care.

The *Panella Reef* is a spot of very foul ground, about half a mile in diameter, from the centre of which the Fort do Mar bears E.S.E. ¾ E. three-quarters of a mile. It has, on some parts, only 3½ fathoms, at three-quarters ebb; on the other parts are 10 fathoms, rocky bottom.

There is good anchorage around this shoal; between it and Fort do Mar in 7 or 8 fathoms; without it in 12 or 14 fathoms; above it 8 or 9 fathoms; and below it, in the same depth, on good ground. Small vessels generally lie between the city and Fort do Mar.

A second danger is the wreck of the large steam-packet *La France*, which was burnt on September 26th, 1856. It lies in 4½ fathoms at N.N.E. about three-quarters of a mile from the North point of the Fort do Mar.

The best anchorage for ships of war is in 10 or 12 fathoms, with Fort do Mar bearing N. 73° E., and Montserrat Fort N. 28° W., at about 1¼ mile from the city. From this spot they will be able to get clear out, with the *very* light morning winds, as the ebb-tide sets strongly toward Forts Cabo and San Antonio.

The *watering-place* is at a short distance from the South end of the town, between it and Fort Gamboa; off the latter a shoal extends alongside, and one-third of a mile outward. It has only 10 feet over it at 3 cables' lengths from the shore, hard sandy bottom. The bastions of Fort Cabo kept just open of the slope of the hill, on which stands a convent with a *double spire* (nearly S. by W.) will lead across the edge of the shoal in 5 fathoms.

A *red* buoy has been placed on this sand-bank, which extends from Fort Gamboa, or St. Maratho, to opposite the obelisk at the public garden. On entering, this buoy must be passed on the right. It is placed with a depth of 2¼ fathoms at low water. The necessity of placing a buoy on this bank is shown by many ships having touched on it.

SHIPS DESTINED TO BAHIA, DURING THE SOUTHERLY MONSOON, should steer for the Morro of San Paolo, now distinguished by the *lighthouse*, in lat. 13° 21' 53", long. 38° 54'. Although this morro is not of great height, it is sufficiently remarkable by being backed and followed to the northward by land lower than itself, and by having on its northern extremity five or six cocoa-nut trees, divided (in 1819) into two groups, and very distinct in comparison with the surrounding land. The hummock, which terminates this morro to the North, when seen from a short distance, presents on the side next to the sea large white spots, which form a striking contrast with the surrounding verdure, and which may, in clear weather, be seen at the distance of 8 leagues; but the lighthouse white, and 80 feet high above the hill, can be seen at 30 miles off in clear weather.

To the *northward* of the Morro of San Paulo the coast is low, sandy, and bordered with reefs; it forms a bay, and then, extending to the N.E., appears as if connected with the high land of Itaporica, on the West side of the entrance of Bahia.

The separation between the western side of Itaporica and the continent forms what has been called the *False Entrance* of Bahia. It is very narrow, tortuous, shallow, and cannot readily be distinguished. It admits very small vessels only; for even the coasters do not use it unless when trading there, or when the wind will not permit them to use the principal entrance.

From the Morro of San Paolo to Cape St. Antonio the distance is 10 leagues, and the direction N.E. In fine weather the two points are visible from each other. From near the Morro a ship may safely steer N.E.; a depth of 30 to 11 fathoms will be found on a bottom of mud, sand, gravel, and coral; and this course will lead at a convenient distance between the edge of the banks to the southward of Itaporica and that of St. Antonio. A large vessel should not go to the N.W. of this line, while to the southward of Itaporica; and, if the wind blow strongly on the coast, she should keep outside until certain of being on the meridian of the point *Jaburu*, the East point of that island, which will be known by the depth being above 11 fathoms.

If necessary to work to *windward*, it will be advisable to go no nearer than 5 miles to the coast of the continent, when to the southward of Itaporica, and to keep at the same distance from the island until Point Jabaru bears North. With this point bearing North, and at 7 miles from it, Cape St. Antonio will bear N. 41° E. *true*, distant 5 miles, and the South extremity of the bank, off the cape, about a league to the eastward; and from thence a course may be shaped for the cape until within half a mile of its shore, and then another direct for the church of *Bom Fim*, on Montserrat, until abreast the Fort do Mar, near which is the ordinary anchorage.

Ships bound to Bahia during the NORTHERLY MONSOON should endeavour to make the land at some leagues to the northward of the Point Itapuan, which has been before described. During the southerly monsoon they steer for the Morro of San Paolo, described above.

The only precaution necessary to be taken by ships from the northward, in order to avoid the Bank of St. Antonio, is to give a berth of 5 miles to the cape, in rounding it, until it bears N. by E. ½ E., when they may steer for the church of Bom Fim (on the peninsula of Montserrat) until abreast of the Fort do Mar, or of San Marcello, near which is the ordinary anchorage. The depths in this course vary from 10¾ fathoms, at a mile West of the Bank of St. Antonio, to 18 fathoms, at the same distance from the fort of that name. Afterward, closing the shore, the depths will diminish gradually to 9 or 8 fathoms, near the Fort do Mar. If, in making this route, the wind should prove contrary, some boards may be made, of 2 or 3 miles, between the bearing which connects Cape St. Antonio and the church of Bom Fim and the banks on the S.E. coast of Itaporica; but it will be necessary to keep the lead going on both tacks, and not to go into less than 7 fathoms.

The ordinary anchorage of ships of war is between West and S.W. of Fort do Mar, at the distance of from 2 to 10 cables' lengths from that fort. From the anchorage, in 9 fathoms, the Point Maguinha of Itaporica bears North 51° West, Fort St. Antonio, South 21° West, and the Point Montserrat or Monserat, North 12° East.

The great number of anchors lost here renders it necessary to round the cables, and examine them frequently.

The anchorage for merchant ships is within the line that connects Fort do Mar and the Point Montserrat. On going in, the Panella Reef must be avoided. The pilots place this shoal at 160 fathoms W. by N. from Point do Mar, and on it, they say, there is not to be found more than 3½ fathoms at low water.

The best place within the anchorage for ships of war is opposite the obelisk of the public garden. Ships moor in a N.N.E. and S.S.W. direction, being that of the flood and ebb tides.

The prevailing wind is from East and S.E., with which ships may get in on one board. During the night the wind is from various points of the compass, and principally from the land side. The winds from North to South, by the East, which prevail most frequently, are always weakened by the heights under which vessels anchor, and the land winds seldom have any strength. In the southerly monsoons only, and principally in the months of July, August, and September, the winds veering sometimes to S.W. blow home into the bay, and cause a great swell, which is very incommodious, particularly at the change of tides; but these circumstances are of short duration; they occur generally at the times of new and full moons, and do not last beyond three or four successive days.

The route for going out is the same as that for coming in, on the reversed direction. A vessel must run along the coast at the distance of half a mile to a mile, until she is abreast and to the westward of the lighthouse of Cape St. Antonio. In this tract, from the Fort do Mar, from 8 to 10 fathoms will be found; and if further off, a greater depth, even to 25 and 27 fathoms. Having arrived at 1 mile West of Cape St. Antonio, and steering S.S.W. 5 miles, the shoal of the cape will be passed in a good depth; after which a course may be shaped for the eastward.

MORRO DE SAN PAOLO Lighthouse.—The handsome lighthouse of the Morro de San Paolo, before alluded to, is built on the top of the hill or cape of the same name, at the entrance of the port, in lat. 13° 21′ 40″ S., long. 38° 54′ 48″ W. The tower will be painted white, and the balcony has an elevation of 80 English feet above the hill, and 276 feet above the surface of the sea, and will be seen by day, in fine weather, at 30 miles' distance. This lighthouse (the best on the coast of Brasil) on Fresnel's principle of lenses, and of the first order, shows, in the space of a minute, a bright light for 15 seconds, followed by an eclipse of 45 seconds. The light, in clear weather, is seen from the quarter deck of a vessel at 20 miles distance and from the tops at 28 miles. Whatever may be the distance, it has always a strong and very bright light, and is distinguished from the lighthouse at the Bar of Bahia by the time of its eclipses, by the greater brightness of its light, and by its colour, which is always brilliant, whereas that of San Antonio has two bright and one red flashes, each followed by an eclipse. At a lesser distance than 12 miles, the eclipses are not total, the bright light is followed by a faint one, in place of the eclipses, which become more distinct as the distance increases; those who observe perfect eclipses may consider themselves more than 12 miles off.

To the northward of the Morro de San Paolo, terminated on the North by Point Garcia, between which and the South point of the Island of Itaporica is an opening improperly called the Barra Falsa in the charts.

Barra Falsa is a small inlet of the Island of Itaporica, further East, formed by the Point of Aratuba, and another to the northward of it, and which, at a distance of 14 miles, has a similar appearance to Point San Antonio, and, like it, looks as if detached from the land to the westwaad of it. Even in daylight these points should not be approached to less than 11 fathoms by vessels without a pilot.

Vessels making the light on the Morro de San Paolo, and desiring to remain in sight of Bahia while they are southward of Itaporica, should not pass to the westward of the above line of bearing of San Antonio from the Morro light, viz., *N.* 46° *E.* (N.E. ¼ E. mag.), or should never bring the Morro light further South than *S.* 46° *W.* (S.W. ¼ W. mag.) A good precaution will also be never to stand into a less depth than 11 fathoms, by which they will avoid nearing the dangers off Caixa-fuegos Point, Barra Falsa, and others on the East shore of the island, which at night become more dangerous from the indraft into the bay after the fresh sea breeze of the day. Besides, after 10 fathoms, the depth decreases rapidly.

Should a vessel find herself in less than 11 fathoms, and yet by her compass not within the line bearing above mentioned of the Morro light, that is, should it be still not to the southward of S. 46° W. (S.W. ¼ S. mag.), and she in less than 11 fathoms, her compasses must be defective, and no time should be lost in tacking to the southward.

The light of San Antonio of Bahia is visible at the distance of 13 to 14 miles, and the faint light between its intermitting flashes of red and bright lights is visible at the distance of 6 miles. (See p. 338.)

Vessels of all sizes may make the entrance of the Port of the Morro, observing that at a mile to the westward of the fort a shoal extends up the River Una, shoaling gradually to the shore, and extending out to seaward nearly 2 cables, in a ridge of rocks called the Cortas, with 8 fathoms close to them. These should be carefully avoided at night by vessels working into the anchorage. By day the ridge is plainly visible by the breakers.

At 2 miles southward from the Morro light is a passage fit for all vessels; and those desirous of entering the port by it may approach the Morro by the northward, and anchor from the fort to a mile within it; but vessels intending to proceed up the river should take a pilot, and they will find a spacious, well-sheltered anchorage.

III.—BAHIA TO PORTO SEGURO AND THE ABROLHOS.

THE ISLAND ITAPORICA, opposite to Bahia, is enriched by numerous villages, delightfully situated. Its chief town is near the North end, is defended by a strong fort, and is the general mart of the island, and the rendezvous of all the launches passing through the inlets and creeks of this part of the bay. There are distilleries here, two churches, and an establishment for preparing oil from whales, which are frequently taken off the coast. Of the latter, many at times are seen, but few only are killed, in large boats, from the shore, to which the prizes are conveyed for boiling.

The island of Itaporica is about 18 miles long, and 5 miles wide on an average. It has a population estimated at 16,000 souls, of whom 7,000 were said to live in its town. San Amaro, situated on a river which falls into the northern extremity of the bay, in a country abounding in sugar and tobacco, was estimated to contain 10,000 inhabitants. Caxoeira, on the river Paraguassu, is built at the point to which the tide ascends, and near some cataracts which interrupt the ascent of the river. In its neighbourhood there are plantations of sugar and tobacco. It contains 25,000 inhabitants. Camamu is a seaport South of the Bahia, and with an estimated population of 8,000 inhabitants; exports to the capital mandioc, rice, maize, coffee, and the bark of the mango tree, which is used in tanning. A row of small islands and rocks skirt the shores North of the Bahia de Camamu, and form a channel by which small vessels can proceed to the Barra Falsa, without being exposed to the dangers of an open sea.

The channel between Itaporica and the main is navigated by small vessels, as we have already noticed, and a passage into All Saints' Bay may thus be made by the coasters, when the wind does not admit a direct passage to St. Salvador from the southward.

The coast of the island of *St. Paul* is bold; the town of this island is the capital of the presidio of St. Paul, but it is a miserable one, though delightfully situated. Here also are a fort and garrison.

Rio Una.—On the N.W. of the Morro of St. Paolo the mouth of the *River Una*, is nearly 3 miles broad, and forms a convenient harbour for vessels of every size. Its western shore is low and sandy, and bordered by a sandbank, more than a mile broad on the outer part, but diminishing inward to a point, to 2¼ miles W.N.W. from the Morro, where the river is about nine-tenths of a mile broad. On this line of direction the soundings, with clean and good ground, vary from 4½ to 5, 6, 7, 8, and 9 fathoms: with secure anchorage, sheltered by the high lands to the eastward, the Morro bearing about E. by N. a mile distant. The landing place is half a mile within the Morro, on a small bay, within which is a village, protected by batteries, and having a red projecting cliff on the West. High water at 3 p.m.; rise, 6 feet.—*Capt. Charles Eden*, 1835.

Without the Morro, on the S.E., is a low islet, *Tinharé*, 3 cables long from West to East, and surrounded by foul ground, with breakers extending from it on the N.E. at 7 cables from the fort on the Morro Point.

The coast of *Boypéda Island*, southward of St. Paul's, is rocky and dangerous; particularly in the southern part called the Morrera Reef. At 3 leagues from the latter are other dangerous reefs, which extend far out from Ponta dos Castelhanos. From the wrecks which have occurred, it is advisable that vessels passing should not approach the coast hereabout within half a league. Boypéda Island is sometimes called *As Villas*, as it consists of a group of wooded hummocks rising above, but detached from the low coast near it, and so resembling dwellings.

Rio Camamu.—Port Castelhanos is the North point of an elevated coast, whence it inclines to a low point, *Ponta da Muta*, off which lies, in the same northerly direction, the little isle *Quiepé*, surrounded by rocks. This isle, with the adjacent coast, form between them a small basin, into which falls the river *Acarahy*, distinguished by the little town of Camamu. It was more closely examined by Captain Mouchez, who says that it is, next to Bahia, the best harbour on the North coast of Brasil, on account of its extent, its depth, and the perfect shelter it affords. Nevertheless its entrance from the North is narrow, with some dangerous rocks in approaching it, and has some rocky patches inside. It should, therefore, not be used except under good pilotage.

The land of the Camamu, to the southward of Castelhanos Point, is covered with mangroves, with some tufts of cocoa-nuts. Its termination may be known by a white rock (*Pedra Branca*) upon the South side of the *Rio das Contas*, a river accessible only by boats, in lat. 14° 18′.

The mouth of the Contas may be seen from the offing. Its South point is high and covered with trees; and, on nearing the coast, a small town will be seen. The South point, *Cape Tromba Grande*, is a high perpendicular cliff of black rocks, about 300 feet high, the transition between the low plains to the North and the high lands southward of it.

From the Contas the coast trends S. ¼ W. 10 leagues. All along it is perfectly clean, and large ships may proceed along it at the distance of 2 miles. The line of coast is broken only by several small creeks or mouths of rivulets.

SAO JORGE DOS ILHEOS.—The Fort of St. George dos Ilheos is situate on the South side of the bay of the same name, and appears like a part of the little town which is the capital of the province. Two remarkable islets lie off the mouth of the river, at a short distance to the East, and form with the coast a shelter for the coasters. A range of reefs extends to the southward, athwart the mouth of the river. Hence vessels proceeding to the latter must round the northernmost islet (*Isla Verde*), off the western side of which they may anchor in 8 fathoms. The isles at a distance appear in the shape of cardinals' hats; one is covered with trees, and the other is bare, and frequently covered with breakers. The *Rio Ilheos* is large, but divided inland into many small branches. The town of St. George, immediately on entering the river, may be seen on the North side. On the bar is little more than 2 fathoms. The North point of the entrance is a high lane, called *Focinho de Cao*, or *Dog's Nose*, at the base of which are some rocks, over which the sea runs in breakers.

The latitude of the Ilha Verde is 14° 47′ 23″. At 3 miles to the East of it the depth is of 18 fathoms, bottom of ooze.

Southward of Ilheos there are few remarkable points, and none of interest to the sailor. *Olivinça*, lat. 14° 58′, is a small Indian village, built in a picturesque situation, with a church on the summit of the hill. At 3 miles South of it is the mouth of the *Rio Una*, a small stream marked by breakers. The *Barra de Canavieras*, in lat. 15° 41′, is the mouth of the *Rio Pardo*, or *Patype*. The surrounding country is very low, but this river is readily known by a *white tower* of wood, on the North point of the entrance, which is clearly seen against the dark verdure. The river is much frequented by coasters, and has 16 or 17 feet, on the bar at high water.

Belmonte.—At the distance of 21 leagues S. 4° E. from the Fort of St. George dos Ilheos is the mouth of a river, the *Rio Grande de Belmonte*, the entrance to which may be known by the town of BELMONTE, a modern settlement. This town commences on the South point of the river, and is masked by heavy breakers on shore to the right and left. The river is said to be one of the second order of the interior of Brasil, but has not more than 2 fathoms over the bar at high water. The province of Porto Seguro is bounded on the North by this river, which divides it from that of the Ilheos.

The coast to the northward of Belmonte is straight, bold-to, and uniformly woody, and may be approached with safety. At from 1 to 5 miles from shore are found from 7 to 20 fathoms of water, over a bottom where oaze and broken madrepores predominate. At about 10 leagues to the North of Belmonte are the southern boundaries of the *Serras da Itaraca*, a group of mountains terminating the low lands which follow *Mount Pascoal*, or *Pascal*, to the North. The southernmost of this group are the *Morros de Commandatuba* (1900 feet), where there is a small river of the same name, in lat. 15° 19′. Beyond the parallel of these mountains the shore, variegated by hills, covered with trees, and small cultivated valleys, presents a very pleasing aspect, onward or northward to Bahia.

From Belmonte, or the mouth of the Rio Grande, to *Porto Seguro* (lat. 16° 26′ 50″) the coast trends S. 15° W. 38 miles. It is covered with trees, which seem to lower gradually on advancing from the South to the North; and it is bordered nearly to the distance of 3 miles off, with sandbanks and shoals, several of which are uncovered at low water, and dangerous to approach without a pilot. The banks are separated by the openings before *Santa Cruz*, *Coroa Vermelha*, adjoining, and *San Antonio*.

The *Araripe Reefs*, in lat. 16° 7′, are the first coral banks which indicate the northern limits of the Abrolhos Banks. The reef itself is a large drying coral patch surrounded by others of the description called here *Chapeiroens*. They extend 3½ miles off Point San Antonio, and continue to the South as far as the Bay of Santa Cruz, for 9 miles, and from the latter harbour. To avoid them do not come nearer the coast than 4 miles, or in less than 13 or 14 fathoms. The low shore affords no marks.

Bahia Santa Cruz and Bahia Cabralia.—The North point of the reef forming the entrance to the river is in lat. 16° 15′ 35″, long. 38° 57′ 26″. High water, full and change, 3^h 40^m.

This bay, which is 7 miles long, and 2 or 3 broad, is protected by a line of reefs parallel with the coast, and is, next to Camamu, the best anchorage on the coast between Bahia and Rio Ilheos. It has, however, been so little frequented that it remained nearly unknown till it was surveyed by Captain Mouchez, in 1861. It is an excellent harbour, and vessels drawing from 10 to 12 feet water can enter the river. It possesses, besides, some historic celebrity, for here Pedro Alvarez Cabral landed on April 24, 1509, two days after the discovery of Brasil, giving the name Porto Seguro to it, since transferred to the bay to the South. Five different reefs lie within the extreme points of the bay, leaving five entrances, all safe but the northern one. The coast is moderately high, and in the centre of the bay is a remarkable depression, through which the river passes: on the North end of the southern hill is the white church, with a red roof of the village of Santa Cruz, the best land mark. On the North hill is a large isolated tree. Ships coming here from the North can make the Morros de Commandatuba; if from the South, a good landfall is Mount Pascual and the high, red cliffs of Porto Seguro. When on the parallel of Santa Cruz, the opening in the hills above mentioned may be seen 15 or 18 miles off, and on nearing the church and large tree will be made out. If the weather be clear two small hills, *Os Irmaos*, 6 or 7 leagues to the W.N.W. of the fort will be seen.

As soon as you are certain of your position, and the church bears E.S.E. 5 or 6 miles, run in W.N.W. toward the village itself, and it will lead through the best channel in 8 or 10 fathoms, muddy bottom.

PORTO SEGURO is formed by a reef or ledge of rocks that extend from a point of the main about a mile out, in a direction parallel with the land, forming a natural mole. These rocks are dry at low water, and terminate abruptly, appearing again faintly at the distance of half a mile; the space between is the entrance or bar of the harbour, over which there is a depth of 20 feet with high tides, but the depth within shoalens to 12 feet. The last may be considered as the average depth of the port. The bottom is of fine sand, gradually ascending to a broad beach.

On entering, the view of the country is delightful. Near the water's edge is a range of fishermen's cottages, shaded with waving cocoa in front, and each having its adjoining orange ground. To the northward the land rises to a steep hill, which is ascended by a winding path, leading to the town, which stands upon its summit. Of the town, the streets are sufficiently broad, straight, but irregularly disposed. The houses are generally of one story, low, and ill built. The churches, of which there are two, have glazed windows, and are, as usual in Brasil, the best buildings in the place.

On the banks of the river, below the town, stands a village of the same extent, containing about 400 cabins or cottages, and 3,000 inhabitants, including slaves and Indians. These people are employed solely in the fishery about the isles and rocks called the Abrolhos. The principal fish, the garupa, is a large one, of the salmon species, which is salted for the Bahia market.

The Baron Roussin says that the small river which falls into the port has, according to the pilots, only 18 feet over the bar at high water, and within are 11 feet; so that it cannot receive large vessels. Several banks, besides, extends to the offing, and it is dangerous to approach within 2 leagues without a pilot. At this distance are 10 fathoms of water.

It is stated above that the town of Porto Seguro stands on the North side of the harbour. The land is scaped or steep, and the ascent to it is by a winding road, remarkable by its reddish colour, by which it may be known on advancing from the offing.

The fertility of the adjacent country offers many resources to vessels which visit the port, and which may easily obtain water, wood, cattle, and all the ordinary refreshments of a tropical climate.

At the distance of 2 miles to the southward of Porto Seguro is the chapel of *Nossa Senhora da Judea.* It is very elevated, and its white walls, in contrast with the trees beyond it, form an excellent seamark.

To the southward of Porto Seguro the coast trends to S. by W. At 2 miles South of the town a series of wooded hills commences, showing conspicuous red cliffs of 140 to 160 feet in height, known as the *Barreiras do Porto Seguro.* At 2 miles South of the high land is the chapel of Nossa Senhora da Judea, and beyond this is a small shallow bay, called that of *Trancoso.* Here are several plantations, and the country appears delightful. Further southward is *Rio do Frade* (River of the Father). The mouth of this is completely choked by the bar, and there is not a single plantation on its banks.

MONTE PASCAL. or Mount Pascoal, in about 16° 53′ 20″ S., and 39° 24′ W., rears its circular white head to the height of 1,758 feet, and is conspicuous to a great distance, serving as a pilot mark in the dangerous navigation to the Rio Caravelhas; for all along the coast hereabout is an assemblage of reefs, sunken rocks, and shallows; yet the neighbouring pilots conduct vessels so skilfully through, that few accidents are known.

Mount Pascal was the first land seen on the Coast of Brasil by Cabral, on April 21st, 1500.

The Mount Pascal is the first remarkable mountain which is presented to view from sea on approaching from the southward: it makes part of a group of hills, extending nearly in a S.E. and N.W. direction, whereof the southernmost presents, at its northern extremity, a piton in form a large square tower, which cannot be mistaken.

When seen from the East, Mount Pascal appears rounded and slightly conical; at 5 leagues from shore it may easily be recognised from its elevation, and the heights surrounding it, which may be seen afar off.

La Marne Bank.—Off this part of the coast the bank of soundings has not been entirely explored. On June 11th, 1865, the French ship of war *La Marne*, when about 20 leagues from land, at 6½ a.m., observed an apparent change in the colour of the water; soon after which some seaweed was passed. At 7ʰ 20ᵐ, soundings were got in 28 fathoms, coral and gravel. About 8ʰ 30ᵐ, the sea resumed its usual colour; *La Marne*, therefore, crossed a bank about 12 miles long from N.N.E. to S.S.W. *true*. The soundings were found to be in lat. 16° 12′ S., long. 37° 55′ W., and a cast of 190 fathoms no bottom was afterwards had in lat. 16° 41′ S., and 38° 23′ W. (Monte Video artillery ground, 56° 14′ W.)

The ITACOLOMI REEFS, an irregular assemblage of rocks and sandy banks, of which several are uncovered at low water, extend in a North and South direction, 7 miles, and are 4½ miles broad, at a distance of 5 to 10 miles from the coast.* From the North extremity of the bank, Mount Pascal bears S. 78° W. At the South end it bears N. 8° W. At their outer N.E. point the white cliffs of Cape Jocema bear N.W. By keeping to the distance of 13 miles from the coast you will avoid all danger, and have from 10 to 20 fathoms of water. At 16 miles more to the East there are 80 fathoms.

As you advance to the land, North of the parallel of Mount Pascal, you may approach it to the distance of 3 miles, where the depths are from 10 to 22 fathoms, on a great part of the coast northward.

In proportion as you approach Porto Seguro, on coming from the South, the cliffs appear more red, and the woods with which they are crowned have an admixture of cocoa trees, a sort of tree seldom seen more to the South. In proceeding along you pass successively before the entrances (hardly visible at 4 miles off) of the Cramimuan, Josima, Frados, the little Bay of Trancoso, and the chapel of N. S. da Judea, before described, as an excellent mark for the port.

Point Corumba, in lat. 16° 52′, is extremely low and bare, being the delta of some small streams. It lies facing the middle of the Itacolomi Reefs, which it approaches so closely as only to leave a channel, 100 yards broad, with 7 or 8 fathoms, but which is only fit for small steamers, well piloted. There is good shelter to the South of the point inside the reefs. (Admiral Roussin placed these reefs, &c., 10 miles too far South.)

Comoxatiba, in lat. 17° 5′ 23″, is a small harbour, half a mile in diameter, which would shelter a few small vessels. Near it are the ruins of the old village of Columbiana. To the South of this commences a line of remarkable red cliffs, 200 to 260 feet high. They continue to within 2½ miles of Prado, and are an excellent landmark. They are fronted by an uninterrupted line of reefs.

Prado, on the parallel of 17° 21′ 40″ S., stands to the North of the entrance of the little *River Jucurucu*, which forms an opening very apparent among the trees with which the coast is covered. You may approach this embouchure to the distance of 3 miles, and have from 9 to 13 fathoms of water, bottom of sand and oaze; and this depth continues, along shore, as far as a league to the North of Comoxatiba.

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* *Itacolomi* is a generic Brasilian name given to many rocks which appear above water, and to round hummocks on the coast.

The *Prado Reef*, a small bank of coral and sand, which uncovers at low water, lies 3 miles East of the Barra do Prado. There is a clear channel inside it. At 3¼ miles S.S.E. of it is the *Guaritiba Reef*, somewhat larger, with a sandbank which stretches for 3 miles to the southward of it. There is a 3 to 4-fathom channel inside it.

The TIMBEBAS REEF properly forms a part of the Abrolhos group, but it is more convenient to describe it here. It is considered to be the most dangerous of all the reefs, because there are no marks to clear it on the low uniform coast. The centre of the reef is 12 miles E.N.E. from the village of Alcobaça, and 13 miles E.S.E. from the Barra do Prado. When Mount Pascal can be seen it bears N. 35° W. from its centre. The coral patches in the centre dry at low water. The sounding lead is of little use in indicating its neighbourhood.

The COAST to the South of Prado trends to S. by E., and at 4 miles from it is the low point of Guaritiba; 6 miles farther is Alcobaça; and 10 miles beyond this is *Ponta Balea*. There are few points remarkable on the uniform and low coast. The chief are the large clump of trees at the Barro do Prado: the *Fincudo*, a large and remarkable round tree, in lat. 17° 35′, and the tree on the North side of the Rio Caravellos, in lat. 17° 43′.

Alcobaça, an Indian village, is in lat. 17° 32′. The mouth of the little river *Itanhem* is 2 miles to the South of it. To the South of it an extensive sand bank bars all access to the coast as far as Balea Point.

Balea (or Whale) *Point*, lat. 17° 41′, is low and wooded. It forms the North point of the Rio Caravellas, and off it the sand bank extends for 4 miles. A flagstaff for signals, and two red roofed houses stand on the point.

The ABROLHOS ROCKS.—Off this part of the coast lie the formerly dreaded Abrolhos Rocks,* and their numerous reefs. They were only partially surveyed by Admiral Roussin, but were more completely examined by Captain Mouchez, in 1861. From the ignorance of their character and extent, and the danger in approaching them, they were generally avoided, but this was a serious inconvenience to the growing trade of the Brasilians; therefore the new survey has done very much service in removing this uncertainty, and also by showing that they afford good shelter to vessels in case of need, when about midway between Bahia and Rio Janeiro.

The Abrolhos consist of five or six groups of coral reefs, which stand on the bank of soundings, and reach to 40 miles off shore. All these reefs rise perpendicularly from a nearly uniform depth of 11 to 12 fathoms. The coral patches are more crowded on the centre than on the outside of the reefs. The outer edges being so steep render them extremely dangerous.

The depth is frequently greater close up to the edges of the coral than farther off. They uncover about 18 inches to 3 feet at low water. The outer masses of coral are called *Chapeiroens*, a Portuguese name for a large hat, but they rather resemble mushrooms, from their summits being much larger than their bases. The coral formations themselves are of surpassing beauty, and resemble the most elegant plants and flowers.

The Abrolhos, or Santa Barbara Islets, are five in number, and are 30 miles distant and out of sight of land. *Santa Barbara*, on which is the lighthouse, is the chief. It is 1,600 yards long, and 350 yards broad, and has several hillocks 100 or 130 feet high. Near its West point is *Redonda*, 131 feet high, with a 13-feet channel between. To the South of it, and connected by a reef, is *Seriba*, 80 feet high, and on the West point of which is the only shrub on the group, a seriba, from which it is named.

A small islet or rock, *Guarita*, lies near the East point of Sta. Barbara. The

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* Abrolhos, *i.e.*, "Open your eyes."—*Portuguese.*

S.E. isle is one-third of a mile long and narrow, lying a mile South of the principal islet. Between them is the anchorage in northerly winds.

The LIGHTHOUSE is the chief distinguishing object on the Abrolhos. It was completed in 1861, and stands on the island of *Santa Barbara.* The light is a *revolving* white light, attaining its greatest brilliancy every *minute.* It is placed at an elevation of 180 feet above the mean level of the sea, and should be seen in clear weather at a distance of 17 miles. The illuminating apparatus is dioptric or by lenses, of the first order. The tower, which is circular, and surrounded by a dwelling, stands on the highest part of the island. It is built of iron, 51 feet high, and surmounted by a bronze lantern. The position of the eastern summit of the island given in the notice is, latitude 17° 57′ 42″ S., long. 38° 41′ 30″ W.

Innumerable seabirds cover the islets with their nests and eggs, but none of these birds are fit to eat. Turtle at times have been found, but not so frequently as the solitude of the place would lead us to suppose. Sea salt, perfectly crystalized, is found in several places, and a small quantity of fresh water filters down to the base at the North point of the northern islet after rains.

Anchorage.—The four islets, as above said, form a small basin of 5 or 6 cables in diameter, with 7 to 10 fathoms, sand and broken coral, and good holding ground. It is perfectly sheltered, except from winds between S. and W.S.W. When these blow the anchorage to the North of the lighthouse island may be taken. It should be remembered that around each islet the coral reefs extend some distance, especially on their West sides.

The Parcel das Abrolhos lies outside the islets, and is the westernmost of the group. It is nearly 9 miles in extent North and South, and from 2½ to 3 miles broad. About the centre of the inner face is the cluster of the Abrolhos Islets. Between them is a narrow channel. The Parcel is composed of coral patches, of small extent, quite perpendicular, and which neither show nor break, except towards the centre of the reef. It is possible, in a well-managed steamer, in fine weather, to thread a passage over the bank between the detached masses of coral, but were it not for the lighthouse its neighbourhood would be most dangerous at night.

The Parcel das Paredes is to the N.W. of the islets, and forms the West side of the Abrolhos Channel. The Parcel das Paredes (or wall-reef) is of an irregular rectangular form, 13 miles from North to South, and 7 or 8 miles broad. It is surrounded in all directions by detached coral patches and chapeiroens, except in the North, where there is a remarkable peculiarity, for here it terminates in a bank of coral raised 3 or 4 feet above low water, and which has 8 to 10 fathoms close up to it. This part is called *Pedra Lixa* (seal-rock). To the S.E. of the Pedra Lixa, at 5 or 6 miles distant, are some large patches which dry, and are called *Pedra Grande*; they form the N.E. face of the Parcel das Paredes, so called because it is wall-sided.

From the North end of the Pedra Lixa the land may be seen, and the leading points before mentioned distinguished from the mast-head.

To the North of the Parcel das Paredes is a line of smaller reefs, called the *Aranguera, Cabocolas,* and the *Area Reefs,* which have narrow but clear channels between each.

In the channel between the Paredes and the coast, or rather the sand-banks off Ponta Balea, the depth increases regularly toward the western face of the Paredes, so that it is only necessary to avoid the chapeiroens, which border the inner reef, to keep in depths above 6 or 7 fathoms which are found in mid channel. In the southern part of the channel this depth increases to 10 or 11 fathoms, and this will indicate when you are clear of the reefs.

To the S. and S.W. of the Paredes are four other cone groups. The nearest to the S.W. is that of *Sebastiao Gomez,* 1 mile in diameter. It is on the West side of the S.E. channel, 8 miles from the Paredes. A good mark for this S.E. channel is a bearing of the double group of the cocoa-nut trees of *Felix;* they stand on the shore, about 2 miles from the S.W. entrance of the Rio Caravellas.

The *Coroa Vermelha Reef* lies 3½ miles S.W. by W. from that of Sebastiao Gomez, and 6 miles off shore. It is thus named because it has a red sandy islet, about 3 feet above high water, on its South point. There are a few shrubs on it, and a post, which serves as a signal. The reef extends about 2 miles North of the islet, and almost entirely uncovers at low water. There is good anchorage between it and Sebastiao Gomez.

The *Villa Viçosa Reef* is a line of drying coral patches, 3½ miles long W.N.W. and E.S.E., and 1½ mile S.W. from Coroa Vermelha. Its N.W. point lies 7 miles from the mouth of the Rio Perohipe, called the Barra da Viçosa. There is good anchorage between all these reefs and the shore.

The *Poppa Verde* is the last of the Abrolhos group. It lies 16 miles W. by S. from the lighthouse islet, and 7 miles South of the Paredes. It never uncovers, and is but little known by the local pilots. Captain Mouchez had much difficulty in finding and in examining it. It is very small, and apparently has not less than 16 feet water on it.

All these coral reefs are to be avoided by the eye. They form large greenish-yellow patches, very plain when the sea is calm, and with the sun behind you, especially when viewed from aloft. The sea being remarkably clear, the coral growth can be readily seen in 6 or 8 fathoms water.

The ABROLHOS CHANNEL.—*Steam-vessels*, under all circumstances, will find advantages in going inside the islets, through the Abrolhos Channel. The same with sailing vessels, with favourable wind, and having sighted the islets or the light. The distance is shorter, and the sea much quieter, for it is a remarkable fact that these coral reefs, rising perpendicularly from the bottom, have a much greater effect in stilling the swell than is found to arise from the sloping beaches of ordinary banks. Besides this, as the channel is now so well surveyed, the lighthouse so efficient as a mark, and the passage quite free from danger, there is no anxiety in passing the Parcel das Abrolhos, which lies outside the lighthouse islet.

Vessels coming from the northward, and making for the Abrolhos, will see Mount Pascal to the S.W. or W.S.W. when in about lat. 16° 40′. This will certify the position of the ship. Being some miles to the eastward of the meridian of the islets, and in lats. 17° 15′ and 17° 20′, the northern edge of the bank of soundings will be found. Some miles further the depths diminish from 30 to 20 and 16 fathoms; and when in lat. 17° 55′ the *Calladas Shoals*, coral banks of 6 to 8 fathoms may be met with; the outermost is 22 miles N E. by N. from the lighthouse, and the innermost is 16 miles, or within sight of the light. Then steer to the westward, and bear to the southward, so as to pass the lighthouse 2 or 3 miles to westward.

In coming from the southward the soundings will be found to decrease regularly towards the shore. At 10 to 15 leagues South of the Abrolhos there is 11 fathoms at 10 miles off shore, 16 fathoms at 25 miles, and 22 fathoms at 35 miles. Steer so as to be in 22 fathoms, when in lat 18° 35′ or 18° 40′, and then the light will be made out soon by steering to the N.E. by N., keeping on that depth. As soon as you gain sight of the lighthouse the depth will decrease from 22 to 19 and 16 fathoms, and in the channel to from 9 to 11 fathoms. By keeping in the depth of 22 fathoms, till the light is well made out, you will be safe from the *Poppa Verde*, the dangerous 16 feet spot on the S.W. side of the channel.

In passing outside the Abrolhos, the only guide to keep clear of the dangerous Parcel dos Abrolhos is a just estimate of the distance from the islets. To do this by the eye alone is manifestly difficult, and would be very hazardous with many. The reef stretches for 4 miles to the E. and N.E. of the islets, and to 6 miles to the S.S.E. The soundings outside are very irregular, and afford but little guide.

The group of islets is nearly of a circular form, and it will be found that in all directions between North, East, and South, that you will be at least 3 miles from the reef and 8 or 9 miles from the lighthouse, so long as *the angle subtended by the whole* *group is not less than* 7° or 7° 15′. It will suffice then for security to measure this angle with the sextant from time to time, and steer accordingly.

The channel between the coast and the reefs may be taken by a steamer with much advantage under favourable circumstances, aided by the chart and a perfect knowledge of the marks. But as this would be difficult to convey in words, it must be left to those aids.

THE ABROLHOS, OR BRASIL BANKS, which form either a continuous range or a series of detached flats, for they have not been completely examined, are placed on the charts as the *Hotspur*, the *Victoria*, the *Pilot Bank*, &c. The delineations of their situation, &c. will be the best guide. They have been before noticed.

These banks, which lie between 16° and 22° South, and between long. 30° West and the coast, are not perfectly known. They have been sounded on by many ships in former years, especially by the *Hotspur*, in 1814. The Hotspur Bank was more completely examined by Capt Denham in H.M.S. *Herald* and *Torch* steamers, in 1852, the result of which is the delineation of a bank extending 14 miles N.W. and S.E., and 10 miles in a N.E. and S.W. direction, with as little as 25 fathoms on the middle of it, and which deepened suddenly from 30 to 70 and 200 fathoms, without bottom. Its N.W. extreme is in lat. 17° 51′ 30″ S., long. 36° 5′ 9″ W. No ripples or discoloration indicated its existence.

The Victoria Bank has been sounded on by the U.S.S. *Congress* in 1817, and another by the *John Adams* 1849, but Capt. Denham ascertained its extreme extent in 1852. Its general depth is 35 fathoms, bending to the South in its general direction from N.W. to N.E. 72 miles in length and 12 in breadth, with one spot at its N.E. extreme of only 19 fathoms, lat. 20° 45′ 8″ S., long. 37° 47′ 33″ W.

All these banks have one characteristic, that of having a hard coralline crust, and also of being very steep-to.

The Baron Roussin has said that an oazy or muddy bottom is rarely found on the ground of the Abrolhos; the presence of oaze in the soundings being a certain indication that you are without the shoals. He found no part without a large mixture of sand and broken madrepore or bits of coral, and in the interior channel only; and he adds that the quality of bottom, most common around the Abrolhos, is a whitish sandstone, composed of the debris of madrepores, and of a greater or less consistence; sometimes this stone is very firm, combined of sand and rock, mostly to the N.E. of the islets. Nearer to these, from S.S.W. to N.E. by the West, the bottom consists of ground like white mortar, in which the anchor penetrates but little, though it holds fast.

In the neighbourhood of the Abrolhos you have coral bottom; after passing them at the distance of 30 miles N. or S., you will have a bottom of light brown sand and shells. The current sets strong over the shoals in a S.S.W. direction. About 30 miles westward of the islands we found a current setting at the rate of 20 miles a day; no doubt with heavy northerly winds they are much stronger, as the currents on the coast are much influenced by the winds. When the Abrolhos Islands bear S.S.W. ½ W., they appear like two hillocks with high table land inside of them: the soundings are from 14 to 16 fathoms, broken shells and bottom rock resembling coral. —*Mr. Jeffery.*

IV.—THE COAST FROM THE ABROLHOS TO CAPE FRIO, INCLUSIVE.

CARAVELHAS or Caravellas.—Punta Balea, with its flagstaff and houses, to the N.W. of the entrance of the Rio Caravelhas, has been before noticed. It is in lat. 17° 41′ 34″, long. 39° 6′ 8″. Beyond the point the coast turns abruptly to the S.W. for 3 miles to the entrance of the Rio Caravelhas. The North bank is well marked by the line of white houses of the village of *Armaçao*, the centre of the whale fishery of all these coasts. Behind this line of houses is a *remarkable tree*, which serves as a land mark.

The South point of the river is a narrow strip of sand called the *Puntal do Sul*, which is also marked by a flagstaff, but the patrao of the bar, has his post on Punta Balea. The channels to the river are across the extensive sand-banks lying off it. There are three of them narrow, shallow, and crooked,—the North, South, and East bars, of which the latter is the best. It is beaconed with long posts, which are shifted occasionally, and well kept up. The outer beacon, which is seldom removed, and is forked or double, bears E. 3° N. from the Puntal do Sul, and 3½ miles S. 30° E. from the flagstaff on Punta Balea. The depths in the channel are 18 feet (25 palms) at high water springs, and 7½ feet (10 palms) at low water. The other passes are also marked by beacons, but all require the greatest care under efficient pilots.

The whale fishery is still pursued here, though the fish are annually becoming scarcer. The Abrolhos is the chief field, and they are towed to the Armaçao to be tried out. The town of Caravelhas is 5 miles up the river, which is quite unimportant. Fresh water may be got at half a mile above town. The people are almost all Indians.

At 14 miles south-westward of Caravelhas is the *Barra da Viçosa*, the mouth of the little *Rio Perohipe*, with the small village of Viçosa 3 or 4 miles from the entrance. At 6 or 7 leagues up the river is one of those unsuccessful German colonies which were attempted a few years ago. It is called *Leopoldina*, and produces a little coffee, &c. *San-Joao do Porto-Alegre* is 15 miles beyond Viçosa. It is easily seen from sea at the mouth of the *Rio Mucury*, which will only admit small coasters, but is navigable within for 15 or 20 leagues.

To the South of this the coast is low, and quite uninhabited. There is nothing remarkable to distinguish any point, but it is generally safe to approach within 2 or 3 miles.

San Matheo.—The little river of San Matheo is 33 miles southward of the Barra da Viçosa, in lat. 18° 37′ 30″. Little advantage can be gained by coming to the bar of this place. The difficulty of the entrance, wherein there are only 4½ feet of water in the ordinary high tides, and 9 feet on the syzigies, does not allow access to any but very small vessels; and the breakers, which constantly appear at the mouth, render the navigation dangerous, even to canoes. Tho people of the country get over this sort of passage only with punts, drawing very little water, or on the rafts called *jangadas*, formed by uniting four or five pieces of timber, surmounted by a cotton sail.

The entrance forms a small opening, with breakers on either side, within which may be seen among the trees the masts of boats. It is said that in fine weather you may see to some distance into the interior, and at a little to the South of the bar three small downs, of which the middle one is the highest, and which serve as a mark from the eastward. The bar is in lat. 18° 37′ 10″, long. 39° 38′ 40″.

The communications between the sea and the interior of Brasil, by the means of rivers, are in general very difficult, and they are particularly so in the river of San Matheo, as well as in a great number of other rivers which resemble it, and which we shall have occasion to notice hereafter. The pilots say that the river of San Matheo turns to the North above the entrance, after which it has many sinuosities. The little town which bears its name is at 7 leagues from the entrance.

At 36 leagues to the southward from the bar of San Matheo is the *Point Tubarao*, on the North side of the bay of *Espirito Santo*. The coast between, generally low and sandy, is broken by the mouths of the small rivers named *Rio Seca*, *Rio Doce*, *Reys Magos*, and *Carahype*, which are all unimportant to navigators. No danger is to be apprehended on this coast until you reach Tubarao, from which point a reef of rocks extend to the distance of 700 fathoms: with this exception you may approach any part of the coast. At 2 or 3 miles off, whether advancing from the North or the South, the depths are from 20 to 9 fathoms, bottom of sand, mixed with gravel, oaze, madrepores, and broken shells.

Rio Seca.—The bar of the Rio Seca is 10 leagues to the southward of that of San

Matheo, and presents only a small opening between the trees on the coast. It is probable that this river exists only during rainy weather, and the supposition seems confirmed by the only information obtained concerning it.

RIO DOCE.—The entrance of the Rio Doce lies in lat. 19° 36′ 57′, long. 39° 45′, 10 leagues to the southward of the Rio Seca. It is said to extend far up the country, but its entrance is too small to admit large vessels; it, however, appears like a large open space between the trees with which the coast is covered. A bank of red sand extends from each of its two points, and the entrance is again obstructed by another bank of sand, which rises above water. The northern point extends out a little more than the other, and has on it a large house.

When over the bar you enter a noble and spacious basin, in which are some islands, and on the South side of which is a village named *Cuartel da Regencia-Augusta*, the houses of which are visible from sea. There are large warehouses for the merchandise which passes up and down the Rio Doce, which is one of the most important rivers of Brasil.

From the bar of the Rio Doce to Ponto do Tubarao, or Shark's Point, the distance is about 16 leagues, and the general trend, with some inflections, S. 32° W. Great part of the coast is low, covered with trees, and the shore is of red sand; but all the interior, from the Rio San Matheo, gradually rises to the westward, and for 10 leagues northward from Point Tubarao the land is more elevated down to the shores; it is only to the northward of the Rio Doce that the country, viewed from the sea, appears entirely flat, and it does not change this appearance till, in proceeding northward, you reach the offing of Mount Pascal, a distance of more than 50 leagues.

There are only two small villages standing on the coast between the beach and the interior marshes, between the Rio Doce and the Serra dos Aymores, as the high lands to the southward are called. The first is a small military post a few miles to the South, called the *Cuartel Combaio;* the next is the *Riacho*, 13 miles from the Rio Doce.

The SERRA DOS AYMORES are excellent landmarks while sailing within sight of land. The first summits visible from sea are a line of low conical hummocks, slightly flattened, commencing in lat. 19° 30′, and increasing in elevation to the South. *Mount Mucurata*, in 19° 51′, is the loftiest of the chain, and is 2,723 feet high, seen 18 or 20 leagues off. It has a triple summit, which makes it appear like Mestre Alvarez, particularly from the the N.E., but no mistake can arise, as this is surrounded by other hills, and the latter stands alone. *Mount Gamello*, lat. 19° 57′, and 1,739 feet high, stands alone on the plain between the sea and the Aymores chain.

Mount Mestre Alvarez, by abbreviation *Mestialvé*, in lat. 20° 9′, height 3,215 feet, is one of the most remarkable landmarks on the whole coast of Brasil. It stands quite alone, near the sea, and its steep sides are clothed with a dense forest, among which are large quantities of the tree producing the famous balsam of Peru. It is an extinct volcano, and has in some directions a flat summit.

The *Barra de Santa Cruz*, in lat. 19° 55′, is easily made out by the neighbouring mountains and by the village of *Aldeia Velha* at its mouth. The bar has only 7 or 8 feet on it at high water. The *Barra d'Almeida*, in lat. 20° 2′, is the mouth of *Rio Reis Magos*, quite impassable. The *Barra Carahipe*, lat. 20° 9′, is on the same parallel with Mestre Alvarez, but is also useless: the same with the *Barra Carapebon*, in lat. 20° 13′. A *shoal*, which breaks at times with perhaps 20 to 30 feet water, lies off here, with Mestre Alvarez bearing N. 62° W., and Mount Moreno S. 51° W., at 2¼ miles S. 75° E. from the Barra de Carapebon.

ESPIRITO SANTO, or PORT VICTORIA.—The entrance of this bay may be readily known, in advancing either from the North or the South, by conspicuous marks, seen from the offing. These are two mountains, whereof the one, situate on the South point of the bay, is named *Monte Moreno* (689 feet), and the other, North of the bay, is Mestre Alvaro, before mentioned, which the pilots pronounce Mestialvé.

Mount Moreno is conical and partly woody, but devoid of verdure on the eastern side, and it may be seen, in clear weather, at 10 leagues off. Its base forms, on the North, the South side of the entrance of the river of Espirito Santo. At 2½ miles to the S.E. of it are two rocks of unequal size, named the *Pacotes*; and at about half a mile S. 60° W. from Mount Moreno is the *Morro of Nossa Senhora da Penha*, a rocky hill 452 feet high, on the summit of which is a handsome convent of the same name, and which may be seen at a distance of 5 leagues.*

At a mile N. by E. of the town of Victoria is the *Frade Leopardo*, a needle-shaped peak, 1,100 or 1,200 feet high, and of singular appearance.

Two islets, situate at a short distance to the N.N.W. of Monte Moreno, occupy a great part of the harbour of Espirito Santo; but, the space comprised between these isles and the hill is much obstructed by reefs and three rocks, la Balea (the whale), and *o Cavallo*, and a dangerous reef, 1¼ mile E.N.E. from Mount Moreno.

Although in appearance an excellent harbour, it is not so useful as it seems, for between the South islet, called Boi (which has a house on its summit), and the foot of Mount Moreno, there is a bar with only 15 feet at low water. Therefore a vessel of greater draught must await the rising tide. Within this it opens into a magnificent harbour, with 4 to 10 fathoms depth nearly up to the town of Victoria, 3 miles from the entrance.

To a stranger the best anchorage appears to be without the entrance, in 12 or 13 fathoms, whence the college at Victoria will be in a line with the northern base of Mount Moreno. Here you will have a bottom of oaze, good holding ground, and be a mile without all danger; and here you will be in a line of direction for proceeding upward, with the assistance of a pilot.

A visit to the Bay of Espirito Santo may be useful and interesting to the mariner. At a league above the town of Victoria, and even in the town, very good water may be obtained. At the habitations on shore you may also procure wood, cattle, and an abundance of fruits of the country, at a moderate price. M. Roussin adds,—We do not think that the climate of this town is very wholesome, as we found it extremely humid. The height of the mountains and lands around, and the great cut of the river, on the North shore of which the town is built, account for this condition. At 1,000 fathoms to the East of the meridian of the town is a large conical rock, named *Pao de Açucar* (*Sugar-loaf*), 446 feet, for which you steer on entering the river, so soon as you have doubled Mount Moreno.

In entering this harbour the first danger to be avoided is the outer reef, which has not more than 9 or 10 feet water over it. It is just cleared to South by bringing the house on Boi Islet on with the peak Frade Leopardo N. 62° E. It is cleared to the North by keeping the church or convent on the summit of Nossa Senhora da Penha well open North of Mount Moreno S. 62° W. Having passed this, steer for the middle of the entrance between Boi and Mount Moreno, avoiding the Cavallo and Balea Reefs on the South side, and the shoal water off the foot of the mount, which is marked by two buoys.

The TOWN OF VICTORIA, capital of the province, and built like an amphitheatre, on the side of the river, may contain 3,000 or 4,000 inhabitants.

Mount Moreno is situate in 20° 19′ 23″ S. Rise and fall of tide in the anchorage about 4 feet. The tides without the entrance are not regular. Within, on the full and change, it is high water at 3^h.

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* This convent and church are very celebrated in Brasil. It is in lat. 20° 19′ 23″, long. 40° 14′ 3″ (Mouchez). It was commenced by a zealous Spanish priest in 1558, and in 1575 tradition says it was finished in a single night by angels, who transported the stones on their wings. It has a great fame for removing incurable maladies, and a constant train of pilgrims come hither with abundant offerings.

ESPIRITO SANTO to BENEVENTE.—Near the land, to the southward of the Pacotes, are the islets and rocks of *Jecu*; and at 13 miles more to the southward are the *Guarapari Islets*, between which and the land is a passage for small vessels; and all may advance to the eastern side of them, for there is a depth of 7 fathoms. Further South, about a league, are the low islets called the *Razas*; and further on at an equal distance is the islet *Escalvada*, at 4 miles from the coast. Large ships may pass within the Razas and Escalvada, as the depths are from 18 to 11 fathoms.

The RIVER GUARAPARI, to the West of the islet Escalvada, falls into the sea between two woody hills, of which that to the South is distinguished by some palm trees, visible in the offing, many houses, and a church with a steeple. The latitude of the last is 20° 43′ 56″. The hill to the South is named in the country *Perro de Cao*; the other is the mountain of *Guarapari*. The latter is the highest; and it appears that to enter the river it should be to the N.W.

The coast hereabout, and to the northward, is of moderate height, almost covered with small trees, close to each other, and having at certain distances low, yellowish cliffs, which are not found to the southward of the Point of Benevente, which is 14 miles S.W. from Guarapari, in lat. 20° 53′ 50″. In the interior of the country are several groups of remarkable mountains, upright, conical, and inclined, which give to this part of the coast a character different from that which precedes it to the North, and follows it to the South.

From the parallel of the Point of Benevente to that of the Isles of St. Anne, in 20° 25′ S., the shore is at a great distance from a chain of mountains in the interior, leaving between them an extensive plain, very low, and extending in some parts 13 leagues. At this distance from the mountains lies that elbow of the coast named *Cape San Thomé*.

This part of the shore of Brasil is nearly level with the sea, and you will perceive only some trees and small patches of land at a distance, the country appearing as if overflowed. Prudence will therefore dictate a sufficient offing. A considerable tract hereabout was only superficially examined by the Baron Roussin, and the information imparted to him by the coasters was erroneous, but the deficiency has been in a great measure supplied by the information of British officers.

At about 5 miles S.W. by S. from the islet Escalvada, or Calvada, near Guarapari, the soundings are irregular, and there is frequent occasion to haul out, in order to keep a depth of 12 fathoms. Some soundings extend out about 4 miles to the S.S.W., and the water about them is discoloured. The least depth found was 6¾ fathoms, and danger, if any, will show itself plainly; for the water shoalens very suddenly from 12 to 8 and 6 fathoms.

An islet named *Francesa* lies at about 4 miles from shore, in lat. 20° 55′; and a reef, having 7 fathoms close to it, stretches about a quarter of a mile from its N.E. point. Between the islet and main the depth is not more than 3 fathoms, shoaling gradually, with a hard bottom. There is anchorage in 7 fathoms, sandy ground, with the islet N.W. by W. ½ W. three-quarters of a mile.

At about 6 miles S.S.W. ½ W. from Francesa are two other islets, *Piuma*, small and low, with reefs extending about half a cable's length from the N.E. and S.W. points. In the passage between them and the land are 5½ fathoms, sandy bottom.

Mount Agha, at the head of the bay, is 685 feet high, and 3 miles N. ½ W. from Francesa Island. It is a useful mark, as it stands alone, conical, in the foreground.

A group of lofty and remarkable mountains runs parallel with the coast between Benevente and Cape San Thome, at the distance of from 20 to 25 miles inland.

Their peaked and needle shaped summits, most singularly rugged and abrupt, are very singular when their base is hidden by the evening or morning mists. When visible they are excellent land marks when near this low coast, as they may be seen 20 or 25 leagues off, consequently at 15 leagues from the land.

Of these mountains the chief are the *Serra d'Itapemirim*, a prolongation of the Serra de Guarapari. It runs W.S.W. and E.N.E., and its highest peak 3,840 feet, is in lat. 20° 46'. The *Serra do Pico*, a mass of mountains lying between the coast and the previous chain, in lat. 20° 51'; it is only about 3 mile long, and some of its peaks resemble the Organ Mountain of Rio. The *Serra Itabapuana*, in lat. 21°, height 3,900 feet, lies N.N.E. and S.S.W. Its singular summits have given it the name of the *Quatro Frades d'Itapemirim*. The South end of the Serra terminates abruptly in a summit, 2,800 feet high, in lat. 21° 7'. The *Morro Garafao*, a singular rugged and isolated mountain, 2,470 feet high, in lat. 21° 14', is on the right bank of the Itababuana River.

To the South of Francesa Island the coast diminishes in height, and at 4 miles S.S.W. from it is the mouth of the little *River Itapemirim*, lat. 20° 58' A small sand islet lies before the entrance. At 5 miles East from the mouth Capt. Mouchez found a rocky shoal of 4 fathoms. In from lat. 21° 9' to 21° 12' there are four or five red cliffs, good land marks. They are called the *Barreiros de Siry*. It is said that a 5 fathom bank lies 3 miles East of these cliffs.

About 7 miles S.S.W. from the islets Piuma, and at nearly 5 miles from shore, is a sand-bank of 4 fathoms, with 9 and 10 fathoms on each side of it; but shoaling gradually toward the land. Its length has been estimated at 1¼ mile long, N. and S., by one-quarter broad. The water on approaching and receding shoalens and deepens very abruptly. Off *Point Murubu*, in lat. 21° 11', there is an appearance of breakers, at 2 miles from land.

The river *Itabapuana* or *Cabapuana*, lat. 21° 19', is wrongly named on the charts the Camapuan. It is only fit for small craft. To the South of the entrance are three low red cliffs, the last on the coast. They terminate 3 miles southward, at *Point Retiro*.

From Point Murubu, in lat. 21° 11', to Cape San Thomé, in 22° 2', the coast is generally a low sandy beach, thickly covered with brushwood, having here and there a stunted tree. The cape, *as it is called*, terminates in a low sandy point; the country to a great extent within it is low, drowned, and intersected by many rivers and lakes.

The soundings off Point Murubu are very irregular, 13 to 9 and 6 fathoms; the water thence deepens suddenly, with a hard, rocky bottom. S.E. from this part of the coast, 10 or 11 leagues off, there are 20 to 22 fathoms of water, and bottom of very fine white sand; but hence toward the shore on the West, and toward Cape San Thomé, it gradually becomes coarser and more regular.

It has been noticed as an indication that may be useful, that in the vicinity of Cape San Thomé, the oazy bottom, so common to the South of this parallel, almost entirely disappears, being here succeeded by a bottom of sand and broken shells; these are, at least, the qualities of bottom found on the survey, from the coast to the distance of 10 or 12 leagues off. It may be remarked again, that at several leagues to the South of the parallel of Belmonte, or about 16° 20' S., commences a bottom of white tufa or sandstone, mixed with, or formed of, broken madrepores, which extend far to the northward, and which is scarcely, if at all, found in the South.

The *River Parahyba do Sul*.—At 14 miles S.W. ½ W. from Point Retiro is a small bay in which is good anchorage, much used by coasters. Into this bay the River Parahyba do Sul falls. Its delta consists chiefly of moving sand. Although an important stream, its bar prevents its being much used. At its entrance is the small town of *Sao Joao da Barra*.*

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* This place should not be mistaken for *Barra da Sao Joao*, at the head of the bay North of Cape Frio.

CAPE SAN THOME, as above stated, is the eastern extremity of the drowned land which reaches to the foot of the mountains before described. The coast itself is quite level with the sea, and gradually merges into some patches of vegetation, 4 or 5 miles inside. At 7 or 8 miles off, this line of verdure cannot be seen, and as it is frequently hazy, even in fine weather, every caution is necessary by sounding to avoid the Bank of San Thome lying off the cape, which is between lats. 21° 59′ and 22° 1′, long. 40° 56′ 23″.

The BANK of SAN THOME.—A bank to the north-eastward of Cape San Thomé, previously omitted in the charts, was explored, in consequence of one of those accidents by which so may dangers have been made known. On this shoal the ship *Earl of Morley* struck and lost its rudder. It extends 9 miles out from the land; the general depth of water on it is uncertain, but on one spot only 3 feet were found. There is a passage between the shoal (now called the *Morley Bank*) and the land, but it has only 10 or 12 feet water.

From the delineation of the shoal by Mr. Napier, R.N., master of H.M.S. *Wellesley*, 1825, it appears to be a rocky bank of an oval form, and 4 leagues in diameter; the southern edge in a line with Cape St. Thomé bearing nearly E.N.E.

From the River Parahyba do Sul, or the parallel of 21° 37′, northward to lat. 21°, the coast gradually heightens, and has several remarkable hills inland; but in 21° the beach is not more than from 30 to 40 feet above the level of the sea. In about 21° 10′ are three remarkable red cliffs close together, the largest being to the southward. In about 21° 28′, at some distance inland, is a remarkable sugarloaf hill, tapering to a fine point or peak at the summit.

From the parallel of 21° to 21° 10′ the soundings are very irregular near the shore, frequently altering 3 or 4 fathoms at one cast of the lead; at 6 miles from land, 5, 7, 10, and 13 fathoms have been found. Hereabout the great bank of soundings appears to be steep on the outside, deepening suddenly from 26 fathoms to no ground at a depth of 100 fathoms. In all the space of 9 or 10 miles over these irregular soundings the bottom is of rotten-stone and coral, changing on the outer edge to coral and shells.

On approaching Cape San Thomé the soundings are very regular, over a sandy bottom, and on approaching the shoal the ground becomes finer; a few casts of mud may be found, but the bottom generally is of fine sand.

The eastern extremity of the *Shoals of San Thomé*, having 4¾ fathoms, appears to bear from the cape between East and S.E. 7 or 8 miles. H.M.S. *Jaseur*, Capt. Martin, in November, 1825, crossed in the last-mentioned depth, and a native smack, about 1½ mile within, from that ship, had 4 fathoms. The least water found upon this shoal, on examination, inshore from the ship, was 3, 3½, and 4 fathoms.

On approaching the cape the water deepened to 5 and 6 fathoms, forming a channel within the bank, the depths in which have not been ascertained.

About the Barra de Furada, to the westward of Cape San Thomé, there is little else than barren sandy flats, with a few fishermen's huts at the entrance.

In 4½ fathoms, and close to the breakers of Cape San Thomé, the current has been found so very strong that a ship with difficulty got out again. In 3½ fathoms to the southward the water was so much agitated, and the current so strong over the breakers, that even a small vessel could not attempt it without danger.

A ship falling in with this part of the coast during the months of April, May, and June, may make toward the land in safety, only taking care not to enter into less than 10 fathoms when off the cape; as it is probable that there will be a current setting south-eastward, at about two-thirds of a mile in the hour.*

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* It was announced in April, 1835, that on the 29th of November, 1834, the Brasilian frigate *Principe Imperial*, in steering S.W. by S. in the lat. of Cape San Thomé, and long.

Pilot or Jervis Bank.—Off Cape San Thomé there lies a bank of soundings found by H.M.S. *Pilot*, Capt. Jervis, which we have named as above. The following are the particulars:—" On December 6, 1843, a.m., running for Rio Janeiro, found the water very much discoloured, sounded in 35 fathoms, sand; at 10^{b} sounded in 25 fathoms; at noon, lat. 21° 44′ S., long. 39° 35′ W., then 16½, shoaled the water gradually, until we had in the starboard chains 15 fathoms, and in the port chains barely 9 fathoms. This continued until 4 p.m., and then shoaled to ½ 12 fathoms, going 3 knots, breeze increasing; then deepened to 16 and 17 fathoms, and shoaled again to 12½; at 4^{h} no bottom with 20 fathoms, at 5^{h} leadsmen in. Lead hove every half hour till midnight; Cape Frio bearing at noon S.W. by W. ½ W. 140′; Cape San Thomé, W. ½ S., 80′; Espirito Santo, N.N.W. ½ W. 109′." This is the account we have of it; but the giving bearings place it several miles to the South and East of the latitude and longitude stated. We have, therefore, marked the position as doubtful on the chart.

MACAHE or Sta. ANNA BAY.—The large bay, formed between Cape San Thomé in lat. 22° 2′ and Cape Busios in 22° 46′, is named *Macahe* or *St. Anna's Bay*. The distance between these points is nearly 22 leagues. The bay is deep and spacious, and the shore throughout is very low. In rough weather the surf is violent, and the broken water runs up a long inclined plane. When the sea is serene, and the ripple comparatively light, it eats away the sands, and forms a flatter beach, with a perpendicular boundary, wherein the laminated appearance of the sand is remarkable. To the southward the shore is covered with shingles, and when it meets the high rocks beyond the River Una, in the S.W. part of the bay, it becomes bold, stretches to the eastward, and forms the point of *Buzios*, called in some charts *Cowries Point*. Near the mouth of the Una is the small secure bay of the *Armaçao*, affording refuge to vessels baffled in their attempts to double the cape, and when the wind blows hard from the East. The entrance is between two small rocky islands. The anchorage lies to the south-eastward of the entrance.

Within the bay, at the distance of 15 leagues from Cape San Thomé, are three islets, named the *Islets of Sta. Anna*. They consist of two larger and three smaller islets, the highest about 500 feet high. These, seen S.S.W. and N.N.E., appear united. The southern isle is the highest, and the lowest is to the East. According to the pilots, the channel between them and the main is so safe, that you may here repair any damage, and careen the vessel if required. The depth to the southward of the isles, at 4 or 5 miles from land, is from 17 to 27 fathoms, oazy bottom.

The *Barra de Furada*, about 12 miles West of the extremity of Cape San Thomé, is an opening through the level sandy beach into a series of shallow lagoons, which inundate the country in the rear. It may be known by a few houses and two cocoanut trees, the only ones on all the coast as far as Macahé.

From the Barra de Furada towards Sta. Anna Islands the depths are regular, there being 9 or 10 fathoms of water, sandy bottom, within 5 or 6 miles of the land. At 4 or 5 leagues from the coast are from 20 to 22 fathoms, muddy bottom. This sort of bottom extends across to Cape Buzios, with 29 and 30 fathoms; a change to sand is a proof of approaching the land.

40° 30′, at 8 a.m. sounded in 32 fathoms; at 3^{h} 15^{m} p.m. in 9, and in 3^{h} 20^{m} in 6½ and 5: the ship running between 5 and 6 knots, a dark, squally morning, with all sail set. No time was lost in shortening sail, and the small bower anchor cut adrift, when the ship was in half four. Her draught was 22 feet, and a heavy swell on at the time.

At daybreak the shoals of San Thomé, breaking very high, bore W. by N. 1 mile distant. At this time it cleared away, and they could see nearly 30 miles from the masthead, but no land was to be seen.

This statement has appeared in our former editions, and although the greatest doubt was then expressed of its truth, it is necessary to repeat it here. Capt. Mouchez says (1863) that the *Principe Imperial* was only 4 or 5 miles (instead of 30 miles) from the North edge of the San Thomé Bank, and that no such bank as reported does exist.

Off the N.E. part of Sta. Anna Isles are several barren rocks; on the N.W. side of the isles is anchorage, in 7 and 8 fathoms, well sheltered from easterly and S.E. winds, but exposed to the S.W. and N.E., but with the latter there is seldom much swell. The proper route to this anchorage is by the S.W., through a clear passage, with 10 and 12 fathoms, close to the isles, near which is the deepest water.

From off the North end of the largest isle a sand-bank stretches to the S.W. and W.N.W., with 3 to 5 fathoms over it, the greatest depth being at above halfway across the passage toward the main. This, therefore, impedes the passage from the N.E.; but the ship may beat out of the S.W. channel. Large vessels attempting the latter should carefully keep the S.W. end of the larger island to the eastward of S.E., because the water shoalens suddenly on the S.W. side of the bank, and likewise toward a sandy beach on the large island.

About Sta. Anna Isles the soundings are regular, excepting on the bank which extends westerly from the North end of the larger island. This bank is steep-to on both sides, the water suddenly shoaling from 7 to 4 and 3 fathoms, bottom of mud, but on the outside of the islands sand only.

From the anchorage, in 7 fathoms, at three-quarters of a mile from the sandy beach on the large island, the bearings are, the S.W. point of the large island South; the northern part of the same, E. ½ S.; the outer point of the S.W. island, N.N.E.; and the islet Ferro, at the entrance of Macahe River, N.W. by W. ½ W. Large ships should bring up further to the southward, keeping the N.W. point of the large isle about S.E. 1 mile, where there will be found 7 or 8 fathoms, at a sufficient distance from the shoal.

There can be no difficulty in gaining the anchorage at any time; only recollecting that the passage to it from the N.E. is hardly of sufficient depth for large vessels.

About the middle of the sandy beach of the large island there is a passage through the trees to a well of scanty and indifferent water; but firewood may be obtained here in any quantity close to the beach.

Hermes Rock.—The rock upon which the steam-packet *Hermes* was lost in Septempter, 1861, has been examined by Lieut. Manoel Antonio Vital de Oliveira. It is a pointed rock, which rises nearly perpendicularly from the bottom, and is entirely detached from the islands forming the Santa Anna group. It is about 35 feet long by 14 feet broad, and has three pinnacles or heads, the highest of which is scarcely sunk 4½ feet. Around it the depths are 5½ to 6½ fathoms. It is in lat. 22° 21′ 10″, long. 1° 25′ 40″ E. of Rio, or 41° 43′ 15″ W., the church of Santa Anna bearing S. 70° W., the North extreme of the islands of Sta. Anna S. 25° E., 3½ miles, the centre of the Papagaios Islands, S. 52° W. 3¼ miles, and the summit of Morro Imburo N. 40° W., the beach 1½ mile distant in the last direction.

Variation 2 W.; high water 2ʰ 30ᵐ; rise 9¼ feet.

Barra de Macahe.—In the bay within Sta. Anna Isles, at 5 miles N.W. by W. from them, is the village of *Macahé*, situated between the northern bank of the river Macahé and the sea beach. It consists of about 150 houses, neatly painted and whitewashed; for the most part small ones, and of a single story, with a few of superior size and pretensions, on a rising ground, near the mouth of the river; where also, near the summit, stand the church and flagstaff. The mouth of the harbour is not more than 70 yards broad, and unfit for the entrance of vessels of more than 200 tons. If the flag be hoisted, it is a signal that the entrance is safe. In going in, a vessel must steer close to the South side of the rock; and when she comes abreast of it, should let go her anchor, with about 15 fathoms of cable. If she overshoot this berth, she must put the helm hard a-starboard, and run between the southern point, where there is a channel 8 feet deep and 2 miles long, with remarkably clear water. A little South of the mouth of the harbour, and close to the shore, lies a ledge of rocks, which must be carefully avoided.

The mouth of the River Macahé bears N.W. by W. from the largest of the Sta. Anna isles, with the islet Ferro off the entrance, a barren rock with some bushes upon it. There are two or three rocks at about three-quarters of a mile from the islet, over which the sea breaks, but there is a passage on either side.

In the river, water may be obtained in any quantity; and a supply of refreshments, by giving two or three days' notice, as they must be procured from the interior country.

At times the water from this river, on running toward the S.W. passage of Sta. Anna Isles, appears much discoloured, like that of a sandbank; but with a change of wind it resumes its proper colour. Such changes in the colour are attributed, not to shoals, but to rains in the interior, and the operation of the wind.

At 12 miles south-westward of Macahé is the mouth of the *Rio das Ostras*, much frequented by coasters, but otherwise unimportant.

The interior land is very rugged, the outer spurs of the *Serra de Macahê*, the most remarkable peak of which is the *Frade de Macahé*, 20 miles N. ½ W. from the Morro de San Joao, and 5,740 feet in height. It has perpendicular sides, and a sharp peak which leans toward the North, but is usually enveloped in clouds. Another remarkable hill is the *Serra Iriry*, 1,800 feet high; it has four sharp pinnacles, and stands 5 miles from the sea, in lat. 22° 27'.

The Morro of San Joao, 2,660 feet high, may be easily known by its insularity on the coast, the undulation of its summit, and its distance from the chain beyond it in the interior. Its lat. is 22° 32', in long. 41° 59'.

The *Barra Sao Joao* is about 12 miles south-westward from that of Macahé. It lies at the head of a sandy bay, and is one of the best on this coast, having a depth (at high water) of 11 or 12 feet. The town is on the left bank, and has a considerable coasting trade.

At the termination of the sandy beach the coast trends to the eastward and assumes a different character, terminating in *Cape Busios*, a large promontory of steep rocks directed to the North. It forms to the northward of it a wide bay, 2 miles in extent East and West, and 1½ mile deep. It is an excellent anchorage, perfectly sheltered, and less used than it deserves to be, as it is but little known.

Ancoras.—At 7 leagues S. by W. from Sta. Anna Isles lies the group called the *Ancoras* (or *Anchor*) *Isles*. These consist of two islets and a large white rock lying to the southward of the inner one, and connected to it by a reef. The outer islet is 5 miles E. by S. from Cape Busios, and between the islets is a channel of 23 and 24 fathoms. The easternmost isle resembles a cardinal's hat. Small vessels, it is said, may pass between these islets and the land; and it is admitted by the pilots that the depth of water in the passage may allow vessels of every class to pass through.

To the northward of Cape Busios is the little isle *Branca*, or White Isle; and the *Islet do Ferro*, or *Feia*, a barren rock, with some bushes upon it, as already described.

Papagayos.—The continental coast between Cape Busios and the *Isle Frio* forms a bay called *Papagayos* (or *Parrot's*) *Bay*. The bearing and distance between its extreme points are S.S.W. 14 miles. A great portion of the bay is occupied by a group of islets and rocks.

The *Papagayos Rock*, discovered by Captain Mouchez in the *d'Entrecasteaux*, lies 1 mile E.S.E. from the highest of the group (365 feet). It is very small and *very dangerous*, having only a very small point even with the water and 7 and 8 fathoms close to it.

At about 6 miles to the northward of the Isle Frio, and at the North end of a low sandy beach, are a small fort and flagstaff, on the South side of the entrance of a little river, which falls down from the village of Papagayos.

CAPE FRIO is a high and rugged promontory, the south-western extremity of an isle bearing the same name, which forms, on its N.W. side, a convenient harbour, *Port Frio,* affording good shelter, although it is open to the N.E. The summit of the isle is in lat. 22° 59′ 55″, long. 41° 56′ 30″.

Frio Isle, which forms the S.E. side of the harbour, is nearly 3 miles in length from N.E. to S.W., and 1 mile in breadth. Great part of it is covered with an almost impenetrable wood. Beautiful flowers abound in every part, and these are not limited to the small class of plants, as there are large trees covered with the most luxuriant bloom; but there are also reptiles in most extensive variety, from the alligator to the green lizard, and snakes from 1 to 30 feet in length, many of which are beautifully variegated. Beautiful birds also abound, but few of them sing; and there are myriads of insects, many of which are distressingly troublesome.

The Isle of Frio may be seen under favourable circumstances at 15 leagues off. When bearing from the East or the West it presents two mountains, one of which is 1,570 and the other 1,300 feet high, above the level of the sea; the southern is the smallest, both in height and breadth. On a N.N.E. and S.S.W. bearing these two mountains seem to form one mass, with a double summit, like two small points; at the same time will be seen a little conical islet, at 1 or 2 cables' lengths to the E.S.E. of the cape.

On all the shore, at the distance of a mile from the North to W.S.W. by the South, are found from 27 to 45 fathoms of water, bottom chiefly of oaze.

Captain Mason, of H.M.S. *Blonde,* says:—The cape is well known as one of the boldest and cleanest headlands in the world, high and remarkable in its outline, once seen easily recognised, readily made out from the views inserted in most of the current charts, and has regular soundings, extending from it for a considerable distance. Yet, because one or two unaccountable wrecks have taken place in its neighbourhood, it is frequently decried and dreaded as a formidable and dangerous promontory, instead of being regarded, as it really is, a faithful and intelligible landmark and monitor."

LIGHTHOUSE.—A lighthouse had long been established on the summit of the island, at an elevation of about 1,000 feet, far too high for such a monitor. From July, 1836, it showed a revolving light, but it was frequently obscured by mist and haze, so that no dependance could be placed on seeing it. It was therefore re-established in 1862.

The *new light* is exhibited from a handsome iron lighthouse erected on the Focinho do Cabo point, the southern extreme of the Island of Cape Frio, at about three-quarters of a mile to the southward of the old lighthouse. The tower is round, and 53 feet high.

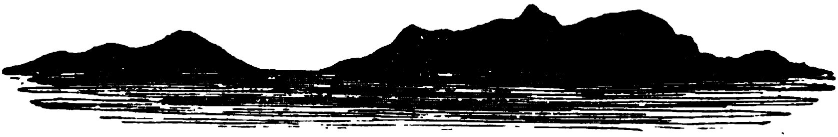
It is a *revolving white light,* said to attain its greatest brilliancy every *minute and a half,* and is seen in all directions from seaward through an arc of 225°, or when bearing between S.W. and East. The elevation of the light is 522 feet above the sea, and should be seen 25 miles. The duration of the total eclipse is only 5 seconds. The former light on the summit of Cape Frio is discontinued.

PORT FRIO, or the harbour, is more than a mile in extent each way, and its depths are from 19 to 4 fathoms; but in the centre, 12 to 16 fathoms. Its great entrance is at the East end, on the South side of an elevated islet, named *Ilha dos Porcos;* this entrance is about two-thirds of a mile wide, and its depths are 25 to 15 fathoms, bottom of fine mud and sand. The entrance from the S.W. is very narrow, but has a depth of 10 and 12 fathoms, and there is anchorage almost immediately within it, for large ships, in 7 to 10 fathoms; further in is a bar, on the shoalest part of which are only 10 and 11 feet; so that this passage is fit for small vessels only.

The harbour is commodious, and secure against all winds, excepting N.E., but even with the latter you may be sheltered by the little isle *dos Porcos* (300 feet high) which lies on the North side of the entrance. This anchorage, wherein the bottom is of good holding ground, is useful to the coasters, who can go out by either of the passes, according to their destination northward or southward, and the direction of the winds.

A small fort stands on a rocky point between two sandy coves on the N.W. side of the harbour, and which entirely commands the principal entrance to the anchorage. A little within this fort was a village, occupied mostly by fishermen. There are some fine sandy places here for hauling the seine, which appeared to be the chief occupation of the inhabitants.

Water may be had from Wells in the coves on the North and N.W., as well as on the island near its West end, where huts may be seen. The tide flows here, on full and change days, until 9ʰ, and its vertical rise is about 4½ feet. *Variation* of the compass, 2° 5′ W., 1862.



Cape Frio bearing W. by S. 25 miles.

V.—CAPE FRIO TO RIO JANEIRO, INCLUSIVE.

The assumed situation of Cape Frio, is lat. 23° 1′ 18″, and long. 41° 57′ 30″. This rugged promontory is the most remarkable headland, as well as the most important landfall, on all this part of the coast. From off this cape to the *Sugarloaf*, on the West side of the entrance to Rio Janeiro, the course by compass is nearly West, and the distance 63 miles. The land between is mostly low and sandy; but at a distance from the beach it rises to a series of elevated and uneven mountains, an appearance interesting and picturesque.

At about half a mile from the extremity of Cape Frio, which is about halfway between the S.W. and West point of the island, is a cove in which H.M.S. *Thetis* ran ashore, and was wrecked, in the night of the 5th of Dec., 1830.

The *Thetis*, having completed her period of service on the South American station, sailed for England from Rio Janeiro on the preceding day. Ships of war returning home from South America being generally freighted with treasure, the *Thetis* had on board 800,000 dollars. The weather, after she had sailed, proved tempestuous, and the wind blowing strongly from the eastward, the effect, as supposed, was a current that was fatal to the ship.

An interesting detail of subsequent events, and the singular means employed for the recovery of the treasure, is given in the "Nautical Magazine," March, April, and May, 1832, illustrated with a plan, by Lieut. Kellett, and two curious engravings. Of the 800,000 dollars, 620,000 were brought up from the bottom of the sea.

According to the report of the British officers, during their stay here for the recovery of the treasure, a small village was constructed near the cove, but there are now only two houses on the island, one for the light keepers, and another on the N.W. creek. Roads were also cut leading to the cliff where the *Thetis* was lost. Previous to this event the island was totally uninhabited. The village, called *St. Thomas*, stood on an acclivity steeper than Portsdown Hill, in England, at about 100 yards from the beach on the West, with evergreen shrubs bearing flowers, in the intervals between the houses; but it must be added, that half of the men employed here were at one time lame from the kind of flea called the *jigger*, so we may conclude that, fine as it is, the island will never have a numerous population.

Ships bound to Rio Janeiro, when approaching Cape Frio by night, with the wind easterly or S.E., must be cautious not to run into the bay to the northward of the cape, such mistake having proved fatal to several ships. This, however, can never happen in future, while the light on the summit of the island is visible. A considerable swell sets in with E.N.E. winds, which are most prevalent.

POINT NEGRA, at 38 miles to the West of Cape Frio, is the first remarkable prominence in that direction. It is formed by a small hill, the extremity of a range of mountains extending to the North, and is covered with a dark verdure, hence its name, and may be readily known. Being steep-to, it may be approached safely. Within 3 miles of it the depths are from 18 to 27 fathoms, bottom of soft oaze.

Between Cape Frio and Cape Negro the sinking of the land is remarkable, presenting no object on the coast, excepting here and there a few little hillocks on a flat, sandy shore, with some scattered bushes. One of these sandhills is distinguished by the ruins of a church standing on its summit, and dedicated to *Nossa Senhora de Nazareth*. This is about 3½ leagues E.N.E. from Cape Negro. Between this church and Cape Frio, within the low, flat shore of *Maçambaba*, is a lagoon, which extends 7 leagues, and has small openings to the sea.

At about 2 leagues from the coast the depths are from 27 to 36 fathoms, over a good bottom of oaze. At 10 leagues are 68 to 80 fathoms, coarse sand, rocks, and oaze.

Two islets, named the *Maricas*, lie at the distance of 14 miles S. 79° W. from Point Negra, and nearly 16 leagues West from Cape Frio, at about a league from the coast. They are of moderate height, steep-to on the South side, and may be approached safely. If, on the approach of night, or under particular circumstances, a vessel cannot reach the entrance of Rio, she may advance to and anchor here.

On the 24th of November, 1825, H.M.S. *Jaseur*, Captain Martin, anchored off the western side of these islets, in 17 fathoms, coarse sand and mud, with the rock off the southern island bearing S.E., the passage between the isles, E.S.E., the northern end of the isles, E.N.E. ¼ E., and in a line with Point Negra. During the mornings of the 24th and 25th the boats were employed in sounding round and between the islands; in every part it was deep, and no dangers but what were in sight. The general depth to the westward of the islands was 10 and 12 fathoms close to the beach, with 14, 15, 16. and 17 fathoms, at the distance of a mile to a mile and a half. Between the islands and main are 13, 12, 11, and 10 fathoms, close up to the beach.

As this place is sheltered from the S.E. round by the North to W.N.W. and more West, with a fine sandy bottom, it may be considered as safe when the wind is to the northward and eastward, or to the northward and westward.

On the eastern side of the isles the sea commonly breaks with great violence, so that landing there is very difficult. The best place is near the N.W. end of the larger isle. In a small sandy bay, on the low part of this isle, is a well with good water, but it cannot be obtained without trouble in getting it off.

Currents.—The general prevalence of the currents in the vicinity of Cape Frio appears to be to the southward, but varied to the eastward and westward, according to the strength and direction of the wind; and westward of the cape it is, *at times*, found setting to the N.E.*

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* Some hours before, and during the East and N.E. winds, the current runs past Cape Frio to the southward, causing an easterly eddy along the South shore, which reaches nearly to Point Negra.

With the wind from West to South, and previous to a change in that direction, an east-

Having previously given the general observations on the Brasilian Currents, made by M. M. Roussin, Hewett, and Lindley, it may not be amiss to introduce here an extract from Major Rennell on the same subject.

The Stream Current of the Eastern Coast of Brasil "is of inconsiderable breadth, till, increased by the accession of drift current by the S.E. trade, it arrives in 16° or 17° South, where, to the distance of 250 miles from the coast, the current runs to the South of S.W., and gradually declines to the southward till it becomes S.S.W., or nearly along shore to Cape Frio, where its rate was found to be 30 miles per day, at 200 miles from the shore. Here, by the fall back of the land to the W.S.W., the direct current is thrown further off shore; and, as generally happens in such changes of direction of the coast, a *counter current* in the bay runs to the N.E. within Cape Frio.* Further to the South, in 30° and 32°, the current is found again to run more westerly, conforming to the trending of the coast, at the rate of 15 to 20 miles per day, and is found at 250 miles from the coast, extending to the North of the River Plata.

"But, upon the whole, no dependence can be placed on the general set of the current; and it is clear, from what has been already said, that it is always uncertain. When the wind is fresh between the North and East it sets strongly to the southward and westward, and with a wind from the S.W. the current will set with equal strength north-easterly, the rate being in a ratio with that of the wind."

RIO JANEIRO.

All the land around the Bay of Rio Janeiro, islands or coasts, are perfectly safe, and steep-to. There is neither bank nor danger to embarrass navigation, and there are only one or two reefs near the islands, but these, being always above water, are readily avoided. The outermost is that which is 1 mile S.W. of Redonda.

The approach to the harbour is so simple and easy that all pilotage is unnecessary. There is nothing to fear. The shores are perpendicular from the bottom, and the lofty granite cliffs and mountains are easily recognisable.

The mouth of the harbour of Rio Janeiro lies between two islets, *Pay* and *May* to the East of it, and a bold point, surmounted by the *Gavia*, a remarkable mountain on the West. In front of it are the islets *Redonda* and *Raza*, within and westward of which are several other islets. From Pay to Gavia the bearing and distance are W. ¾ S., 11 miles.

RAZA LIGHTHOUSE.—The Islet Raza is low, and appears from the East like a slipper, with the sloping side northward. It is distinguished by a *lighthouse*, 50 feet high, painted *red*, which was first lighted on the 31st of July, 1829. The light is elevated 315 ft. so as to be seen nearly 20 miles off. It makes a revolution in every 2½ minutes, and presents alternately a brilliant and a *red* light. The utility of this light is too obvious to require comment.

Harbour Lights.—Besides this powerful light on Raza, off the mouth of the harbour, its eastern point, on Fort de Santa Cruz, has a *bright fixed* light, visible 6 miles off, and on *Calhabouco Point*, the eastern extremity of the city, is a *red fixed light.*

At 2 miles W. by S. from Raza is another isle, more elevated, appearing exactly

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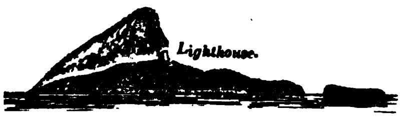
erly current passes the cape, and extends some distance to seaward. The rate, in both cases, is from half a mile to a mile and a half in the hour.—*Captain Hon. F. de Roos, R.N.*

* To this current may be mainly attributable the melancholy catastrophe of H.M.S. *Thetis.*—Ed.

like a haycock, and called *Redonda* (Round) Island, 726 feet high. At 1 mile to the S.W. of it is a reef, which shows 10 feet above low water.

These isles are very useful marks to vessels bound to the harbour; for a vessel bound to Rio Janeiro should, after rounding Cape Frio, steer due West, keeping about 3 leagues from the coast, until she makes Redonda, and which will be described before Raza can be seen, although the latter lies 2 miles more to the eastward. CURRENTS, at times, set along the coast, either East or West, according to the winds, and thus retard or facilitate the ship's progress.*



Raza and Redonda, bearing W. ½ S. about 3 leagues.

The position of Rio Janeiro may be seen by night frequently, at very great distances. When the masses of cloud, *cumulus* or *cumulo-cirrus*, overhang the city, the reflexion from the innumerable gas lights causes such a strong reflexion in the sky, which is quite unmistakable that its situation is certainly known by it very long before the light comes in sight. This is the case with most or all maritime towns of any magnitude, but is especially noticeable here.

The first land generally seen, on advancing toward Rio Janeiro from the eastward, is Cape Frio, giving its name to the adjoining district. Without the cape on the North, is the Bay of Papagayos, which exhibits a fair specimen of Brasilian scenery.

From Cape Frio, westward, a stranger, having no vessel under his care, would proceed most pleasantly along shore, until the *Ilha Pay* is brought on with the sugarloaf on the western side of the Rio Janeiro. This would give him an opportunity of seeing every inlet on the coast; some of which, bordered by lofty masses of naked granite, are very beautiful. It would place before him, almost in a line, the *Corcovado*, *Gavia*, *Two Brothers*, and other mountains of singular form, uncouth names, and stupendous altitude. During the morning fogs, which hover about the shore, some of these raise their heads high above the mists, and serve as guides to the port; the Gavia is the most to the West, of the greatest height (2,575 feet), and has a remarkable flat top, which seems an immense cube, or table of stone, with perpendicular sides, placed upon a mountain. The Corcovado, a little more to the eastward, is a lofty point of rock (2,272 feet), which appears to pierce the heavens. Steering for this, when far out at sea, brings a vessel near to the Sugarloaf, a much lower and conical mountain, with its steepest side to the West. Close to the foot of this rock lies the passage into the harbour.

While rounding the Pay Isle the entrance is not visible; but in proportion as the Sugarloaf draws to the northward of the ship, the gorge opens, and through it is beheld the calm expanse of what is generally deemed the finest bay in the world. The entrance is about a mile wide, and fenced on either side by solid masses of granite, one entire stone without a chink; that on the West is nearly 600 feet high, commonly estimated at much more; its neighbour on the other side rears its head to a somewhat greater elevation, and is topped with a signal staff, from which the first notice is given to the city of approaching vessels. Both hills are very abrupt and skirted with forts, the advance of which is defended on both sides by strong double curtains. Immediately in front, and a little within the narrowest part of the entrance, is the battery of the Lagé, a low, square fort, situated upon a mass of naked rocks, against which the water breaks with violence, and in stormy weather sometimes overtops the battlements, reducing the garrison to great distress and some danger. The fort of Santa Cruz, on the right hand, is very formidable, and the water is deep close to the rock, so that small vessels may render them perfectly useless.

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* HAILE SHOAL.—The following desultory notice of a shoal lying off the mouth of Rio Janeiro we quote from the "Nautical Magazine," May, 1846:—"The ship I was in passed directly over a shoal, the position of which I do not see marked on any chart, bearing off Sugarloaf N. 7° E. *true*, distance *about* 24 miles, extent about 200 yards in diameter. Bottom, sand and rock. There were no soundings taken, but I should think there cannot be less than 8 fathoms over it.—*J. C. Hayle.*" We have placed it on the chart, marked doubtful as to situation, &c.

The Baron Roussin says the mountain called La Gavia is situate about 3 leagues W. by S. from the entrance of Rio. It is seen from all points of the offing between the East and S.S.W. Its top appears to be flat, and rather larger at its summit than a little way below, which gives it the appearance of a ship's top, from which it is named, hence it cannot be mistaken for any other mountain, and it is the best object for distinguishing the coast. It is situate in lat. 22° 59′, and long. [*corrected*] 43° 13′. Hereabout the variation of the compass, in 1819, was 3° 43′ E.; in 1867, it was 2° 0′ *West.*

At 11 miles E. ¼ N. from the Gavia is the *Pao de Açucar* [Sugarloaf], the conical mountain of rock on the western side of the entrance to Rio Janeiro. This rock has been generally considered as the beacon which serves to mark that entrance; but being much lower than the Gavia, it is not seen at so great a distance.

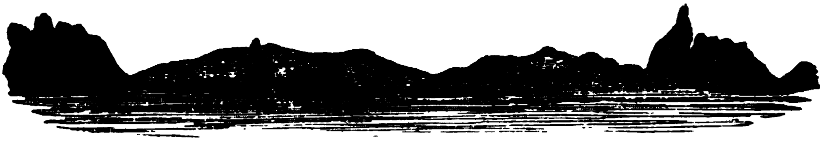
These remarkable land marks cannot be mistaken, and are approaching from the S.E. or S.W. There is a singular resemblance to a sleeping giant, which much struck the arctic navigators. The Gavia forms perfectly the head, with a Bourbon profile, and the feet are formed by the Sugarloaf. When the King of Portugal arrived here in 1807 a painting was exhibited of this recumbent colossus as the genius of Brasil, with the words "giant arise" written over it.

It is prudent, in general, to keep at some distance from the coast which connects Rio Janeiro with Cape Frio; because, when the wind blows from S.W. to E.S.E. by the South, the swell is incessant, and in rough weather it renders the anchorage very unsafe. You should not approach the islands situate at the entrance of Rio until the sea breeze is well set in; and then you must manage to reach an anchorage before night. Without this precaution you will be exposed by stopping among the islands or at the the entrance during the calm which intervenes between the sea and land breezes; or encounter the latter, which directly opposes the entry, and is very often accompanied by gusts of wind, which are sometimes violent, more especially at the full and change of the moon.

If, notwithstanding all precautions, the land breeze should set in before you have entered the harbour, and your vessel sails badly, or if the current, which almost always, sets outward, will not allow you to reach the inside of the bay by tacking, it will then be more advantageous to remain outside of the islands than to anchor among them. The space for tacking is very limited, especially during the night; the ground is hard, and the swell of the sea is the stronger and more troublesome the nearer you are to the entrance. The strongest gusts of wind from the land breezes seldom extend further out than to Redonda, or Round Island.

ON ENTERING AND LEAVING THE HARBOUR.—The passage generally preferred, on entering and leaving the harbour, is that between the isles Pay and Raza. The first lies at 4¾ miles S.E. by E. from the Sugarloaf, and the latter 7 miles S. ¼ E. from the same. The isles are steep-to, and you may pass close to either. In the channel between are from 21 to 11 fathoms, bottom of gray sand.

Should you enter at a mile to the West of Raza, or midway between Raza and Redonda, you will have the western point of Pay nearly N.E., and a direct course thence N. by E., 8 miles, will carry you to the West of the fortress of Santa Cruz, which stands on the eastern side of the entrance. On this track you leave, at a distance to the West, several islets and rocks, lying to the N. by W. of Redonda, and pass about half a mile to the East of the islet *Catanduba*, or Tucinhos, lying near a mile to the South of the Sugarloaf. In this route the soundings decrease gradually from 24 to 7 fathoms, bottom of fine gray and white sand, stiff ground. There is no danger, and nothing to avoid but what may be seen.



The entrance to Rio Janeiro, bearing W.N.W.

The least depth of water at the entrance of Rio is 6½ fathoms; having passed this the depths increase rapidly; in one cast of the lead you may have from 11 to 14 fathoms, very near to the battery of Santa Cruz. You may safely approach still nearer to the opposite side, but the first direction is the most followed, it having the treble advantage of leading a vessel near to the fortress, of answering the signals made therein, and of keeping clear of the little isle *Lage*, with its fort, on the opposite side of the channel. Thus also you will avoid the effect of the current, which sometimes runs to N.W., when the tide is rising.

The passage between the fort of Santa Cruz and that of Lage is the only one frequented; that between the latter and Point St. Joao is never used, not from want of depth, but because it is narrower, and exposed to shifting winds from about the Sugarloaf and other high lands. Here also the current is irregular, and the ground rocky.

From about 3 cables' length off Fort Santa Cruz the direct course to the anchorage for ships of war is *N. 35° W. true*, until you are E.N.E. of the fort of *Vilganhon*, which you pass safely at the distance of 3 cables. From this spot you will steer for the *Ilha dos Ratos*, or *Rat Island*, and having now arrived before the city, you may choose your anchorage in from 19 to 10 fathoms, bottom of mud; only observing not to bring the Sugarloaf to the westward of Fort Vilganhon. The best place for ships of war is to the E.N.E. of the palace, to the South of an imaginary line from Rat Island to the principal church of the city; the bottom, in from 14 to 18 fathoms, is excellent. Here you will avoid a small rocky bank, lying at 2½ cables E.N.E. of Rat Island.

The *Isle Cobras*, or *Serpent's Isle*, is the fortified isle to the West of Rat Island. If from the flagstaff of Fort Vilganhon a line were drawn to the Isle Cobras, it would separate the depths proper for large vessels from those of 4 to 2 fathoms, which are frequented only by coasters and merchant vessels.

The anchorage for merchant ships is the N.E., and adjoining to the city. The larger ones arrive at it by passing the Isle Cobras, and are separated from the Men-of-War Road by a shoal bank, on which the sea breaks at low water, spring tides, when the winds from the offing are violent.

Vessels commonly moor North and South in the bay of Rio Janeiro; but it seems preferable to moor N.E. and S.W.; this direction, being nearly that of the flood and ebb, renders it easy to lay the vessel athwart the land and sea breezes, which are almost the only predominant winds. This will in summer be found necessary; for at that season the heat is at times almost insupportable. A hawser, carried alternately from one buoy to the other, according to the wind, will gain this advantage, so important for the salubrity of the vessel; the flood anchor to be on the port, and that of the ebb on the starboard side.

The land and sea breezes ordinarily divide the 24 hours. The first begins in the evening, continues all night, and ends at about nine or ten o'clock in the morning. One hour of calm succeeds this, and generally at about 11 the sea breeze penetrates into the bay, and continues until sunset. The strength of these breezes is not uniform; at times there are total interruptions; the calm, at times, will prevail for days together, or be varied momentarily by breezes without any fixed direction; but such circumstances are of rare occurrence.

The Tides are not regular or of equal duration, as the ebb generally runs much longer than the flood, more especially after heavy rains. The ordinary velocity of each rarely exceeds seven-tenths of a mile in the hour; but at times it may run at the rate of a mile and three-tenths, principally during the ebb. The time of high water, on the days of full and change, is at $2^h\ 45^m$, and the vertical rise 4½ feet; neaps only 3 feet.

The safety of the anchorage is nearly uniform, and is very rarely disturbed by winds causing serious accidents.

Vessels in the Road generally take their water from a large fountain erected on the quay of the *Place do Mar*, before the palace; but the water is not very wholesome, as it frequently causes dangerous colics in the beginning of its use; but this is considered by some to be rather owing to the fruits and liquors taken here.

The BAY, or rather GULF OF RIO JANEIRO, is very spacious, and one of the most magnificent in the world. Its extent in diameter is from 3 to 4 leagues, in several directions between mountains of majestic elevation, covered with the richest verdure and terminating in an easy declivity, occupied by numerous villages down to the sea. Plantations of all sorts, handsome country houses, surrounded with trees, many isles, woody and inhabited, ornament and diversify the surface and the coasts of this little inland sea, and there is not on the globe a more beautiful residence, or an aspect more imposing or agreeable.

The anchorages for large vessels do not extend far to the North of the parallel of the city, but all the bay is navigable for a multitude of small vessels or country boats, which form an animated scene.

A stay made in the Road, as in most roads subject to a high temperature, causes on the ship's bottom the adhesion of a great quantity of barnacles and other marine productions, which vegetate quickly, and soon cover over all of the sheathing; these injure the copper, and impede the velocity of the vessel: they must therefore be frequently cleaned off.

Fish are not abundant, owing to the number and motion of the vessels; and the consumption of those taken is not safe, in consequence of the great number of vessels sheathed with copper. Shell-fish, and oysters in particular, ought to be avoided.

On LEAVING the ROAD of Rio Janeiro the most simple precautions only are required; it will be sufficient merely to attend to the land breeze and the ebb tide, allowing them to carry you along; even the ebbing is not essential if the breeze has that strength which it usually acquires during certain hours daily.

To be better prepared for getting under weigh, vessels frequently on the evening before their departure get on the side of the bay which faces the town, by which they avoid any obstruction in the Road, properly so called; and some take advantage of the strength of the land breeze, but this is not really necessary, for a vessel may easily set out from any part of the usual anchorage.

The route for going out is the same as for entering; passing at 3 cables' length to the East of the Isle Vilganhon, and at the same distance on the same side of Fort Lagea, and ranging within hail of the fortress of Santa Cruz, taking care in this track to keep over to the eastern side rather than the other; these are the only requisite precautions.

As you generally weigh anchor in the morning, it is probable that you will have the advantage of the land breeze at least for four hours; this will enable you to pass all the isles in the bay; and having arrived here, you may tack according to circumstances. Should you experience a calm between the land and sea breezes, before you get without the islands, it will be proper to anchor, choosing a favourable position, so as to get under weigh again with the first breeze that ensues.

The CITY OF RIO JANEIRO, or **SAO SEBASTIAO,** contains all the buildings and attributes of a large and handsome city. It is built on a low and marshy plain, surrounded by the sea on two sides, and on the third hemmed in by two small parallel ridges running E.N.E. and W.N.W., which shut out the sea breeze. Therefore its position, and the difficulty of drainage, cause much unhealthiness and many disagreeables at variance with its pretensions as a capital.

Since 1835 it has formed the metropolitan district (*corte municipio*) of Brasil, and is not the capital of the province, which is NITHEROHY on the opposite side of the bay to the eastward. In 1819 it contained a population of 120,000, and in 1840 only 140,000. It is now estimated at 360,000. It is a busy place near the quays and in the principal streets. It is also most brilliantly lighted with gas up to the foot of the surrounding hills, and cause that reflection in the sky before mentioned, which is sometimes visible 30 or 40 leagues off at sea.

There are many landing places at the quays before the town. Some are simply slopes or hardways, others have stairs. The convenience of their use depends on the state of the sea, which is seldom so agitated as to impede the communication between the shipping and the shore; but the filth of the town at these places renders the approaches at all times disagreeable.

Another feature of the city is the fine Carioca aqueduct, which brings water from the Corcovado, constructed in 1750 of stones brought ready prepared from Europe. The environs of the city are extremely picturesque, and afford the most charming walks imaginable. The noble bay, like the Reconcavo of Bahia, has not had justice done to it in any work on Brasil. One of the most interesting localities is *Petropolis* (named after the Emperor). It is reached by steamer, which lands you at the railway station, at the head of the bay, from whence you are conveyed to the foot of the lofty mountains, and then up to the summit by vehicles to the new city, at 3,000 feet above the sea, a colony of Swiss and Germans, founded by the present Emperor, who has a handsome residence here.

Nitcherohy, the capital of the province on the other side of the bay, has no particular feature to remark on. *Praia Grande* and *Santo Domingo* here are the localities where the country houses of the people of Rio abound, attract large crowds of people on Sundays and fete days, who come hither in the numerous steamers.

Besides the railroad to Petropolis, two others are in course of construction, the most imposing of which is the Don Pedro Railroad, which is to form a direct communication with the rich province of Minas Geraes and Sao Paolo, and will bring down the coffee and other products for exportation. It is already partially in operation.

Coal is most easily taken in at the island *Mucangue Pequenho*, where the chief depots are found. It lies to the North of Nitcherohy, and can be easily reached without a pilot, only be careful of a small rock off the S.W. point of Mucangue Grande, the island to the South of it. *Water* is brought alongside in tanks, and is of good quality.

Rio Janeiro possesses, in abundance, all the resources which mariners can require. Vessels may here be careened, remasted, and furnished with all things requisite; but all is expensive, and repairs are very dear. Provisions, though plentiful, are not very cheap, cattle excepted; and the flesh of these is not only of indifferent quality and flavour, but frequently unwholesome; a disadvantage common in hot climates, and particular on the greater part of the Brasilian coast.

Except the articles of simple necessity, everything else is very dear, and labour is extremely high, as in all South America. The cost of living on shore is said to be two or three times greater than in London or Paris. Fruit is especially dear.

CAPTAIN HEWETT'S DESCRIPTION AND DIRECTIONS are as follow:—The immediate entrance of the harbour of Rio is known by two lofty peaks, one on either side; the western resembles a sugarloaf. It bears that name, and *differs from every other on the coast* (for there are many), by the inclination of its summit to the *westward*.

If night be too far advanced, a preference ought to be given to remaining under weigh, rather than to anchoring without the harbour, the ground being rocky, and much exposed to a heavy rolling swell, which increases as it approaches the bar, the shoalest water on which is but 6½ fathoms. The certainty of the sea breeze before noon of the following day, and the tempestuous and general violence of the land breeze, accompanied by heavy rain, &c., particularly at the full and change of the moon, renders necessary the precaution of standing off and on from and to Round Island; for to it the violence of the squall seldom extends.

The FLOOD TIDE in the HARBOUR is of shorter duration, and of less force than the ebb, against which and a strong land breeze our ship, the *Inconstant, turned in*, to the astonishment of the Portuguese; an effort never before attempted. After violent rains the rise of the water in the harbour has very little influence over the ebb tide, except diminishing its strength. The ebb has been known to run a whole day without intermission; the current strongest on the western side; but an eddy flood will sometimes be visible on the eastern side, when the water is discovered to rise.

The ENTRANCE of the HARBOUR, between the FORTS SANTA CRUZ and ST. JOAO, is in breadth three-quarters of a mile. The passage between St. Joao and *Layea*, or *Square Island*, situated immediately in the entrance, should never be attempted, although the greatest depth of water is to be found there; the narrowness of the channel, the likelihood of the winds becoming variable under the Sugarloaf, the irregularity of the tide, with the rockiness of the bottom, if compelled to anchor, render it dangerous, if not impracticable. The true channel is on the eastern side of Lagea Island, to abreast of which, from the bar, the water gradually deepens from 6½ to 21 fathoms; and when a little past it, the ship's head being N.N.W., soundings are lost for a short time with the common handline.

Leaving Fort do Vilganhon (also on an island) on the left hand, the best anchorage is obtained *for vessels of war* abreast the city, with the flagstaff of Vilganhon just open to the westward of the Sugarloaf. By taking this precaution, a small bank, very dangerous for cables, will be avoided. The bank is situated about 2½ cables' length from *Ilha dos Ratos*, or Rat's Island, in an E.N.E. direction; it is circular, about a cable's length in diameter, and very rocky; the mark for 4½ fathoms, which is the shoalest water, is Ilha dos Ratos and the Great church in one, and Vilganhon flagstaff on with Theodosia battery, on Point San Joao; so that its vicinity to Ilha dos Ratos renders precaution necessary in mooring. The best bower, with a good cable, should be laid down to the westward, in order to preserve an open hawse to the entrance; a stream cable bent on to the small bower anchor, and taken in at the stern port, will preserve a free circulation both from the sea and land breezes, and the ship's head will thus be directed to the only points of the compass from which the wind can be expected to blow fresh, and which are from N.N.W. to S.W.

MERCHANTS' ROAD.—*A bar of sand*, with some rocks, extends opposite to the city, the outer edge, nearly in a direct line from Vilganhon to Ilha dos Ratos, and ending at the N.E. point of Ilha dos Cobras; this bar is passable for boats only; but within it all merchant vessels, that there is room for, discharge and take in their cargoes; the only passage to it is round the North end of Cobras, near which are the arsenal and Brasilian vessels of war.

DIRECTIONS for RIO JANEIRO, for vessels approaching from the *southward*, by the BARON ROUSSIN.

The approach to Rio Janeiro is *generally*, as we have shown, by Cape Frio, which is admitted to be correct during the northerly monsoon, and when advancing from the northward or eastward; but under other circumstances it will be disadvantageous, by losing time and prolonging the voyage.

For vessels from the southward, and during the southern monsoon, the *Ilha Grande*, the *Morro of Marambaya*, and above all the *Gavia*, in the West, are the best objects of recognisance; as all these may be seen at a sufficient distance to serve as a guidance on the route, and an estimate of the distance to the anchorage.

On advancing, another good indication is the peculiar figure of the land between the Gavia and Sugarloaf. When coming in from the offing, between the E.S.E. and S.W., the configuration of their summits presents, in a very remarkable manner, the figure of a man lying on his back, from W.S.W. to E.N.E.; whereof the Gavia forms the head, and the Sugarloaf the feet. When the tops of these mountains are free from clouds or mists, it is almost impossible not to be struck with this appearance.

The Gavia, as already noticed, is situated at about 3 leagues W. by S. from the entrance to Rio Janeiro. Its summit appears flat, and rather larger than the surface below it, and which gives it the appearance of a ship's top. This mountain and the Sugarloaf, at 8 miles to the eastward of it, have been previously described.

On approaching Rio Janeiro from the southward soundings may be obtained at a considerable distance from the land, but at a great depth. At 10 to 15 leagues off they vary from 60 to 80 fathoms, and diminish gradually to the coast: the bottom is a mixture of sand, gravel, broken shells, rocks, and oaze or mud.

Routes between Bahia and Rio Janeiro (by Captain Mouchez). From an attentive consideration of the winds at different periods of the year, the following rules may be laid down.

There is no difficulty in running down the coast from Rio. But during the months of May, June, July, and August, there may be some drawbacks from contrary winds, or squalls from the South, for it is at this season that the trade winds hold most from the southward, but generally it blows from between E.S.E. and E. by S. It is unimportant whether you pass through the Abrolhos Channel or outside the islets. It is when near Cape San Thomé that there is the greatest probability of meeting with contrary winds, and the most so in June. But having passed this, always close in with Cape Frio, as no advantage will be gained by keeping off shore for favourable winds.

From Rio to Bahia the most difficult months are between November and February, when the winds hang most to the northward, and they are at times very fresh from N.E., particularly when near Cape San Thomé. It will be better during this season to run off to the E.S.E. for 150 to 200 leagues before coming round on the starboard tack. The wind will then be found less ahead, and you will avoid the northerly current, which is strongest when the trade wind blows freshest, and runs at a greater rate, according as you near the coast, when it attains a velocity of 1¼ mile an hour. November, and particularly December, are the worst months, and then you should run down farther East, than in the other unfavourable months.

During the rest of the year, that is from March till October, keep as close to the land as is prudent, and do not keep off to the East except when you encounter very strong N.E. winds near Cape Frio or Cape San Thomé, which sometimes occur even in the S.W. monsoon. But they do not last longer than two or three days, and are followed by calms or light S.W. or S.E. airs. The route will thus be much shortened, as much will be saved by not standing out to the eastward.

There is no dependance to be placed on meeting with or taking advantage of the sea and land breezes between Bahia and Cape San Thomé. They are scarcely felt, particularly in the bad season. The land is too low and too humid to be affected by the winds in this way, as is found to be so regular near Rio.

Steam vessels should rigourously follow the shortest route, all circumstances being favourable. Therefore between Rio and Bahia the coast should be kept in sight, and the more difficult localities should be more carefully guarded against. During the night, also, the vessel may be kept more off the land, but with the ordinary seamans' care, aided by the charts, there are neither difficulties nor dangers.

VI.—RIO JANEIRO TO SANTOS.

MARAMBAYA ISLAND, which begins at 9 leagues to the westward of the entrance of Rio Janeiro, is 20 miles in length, and forms the large *Gulf of Marambaya*. Of this gulf the general depths within are 3 and 4 fathoms. It is bounded on one side by the main land, and on the other by the *Restinga*, or island. The latter is a narrow bank of sand, about 20 feet above the level of the sea. In most parts, especially near the middle, it is quite bare, in others it is covered with various creeping plants, which keep the soil together. It exhibits on its summit a little brushwood, and at its northern extremity some mangrove. Toward the sea it is steep, and the surf breaks against it with violence; toward the bay it is level and smooth. The latter portion abounds with shellfish and sand-larks. The herbage shelters many armadilloes; and deer, with other animals of chase, present themselves to the sportsman.

MARAMBAYA, at the western end of this sandy track, is a single bold mountain, about 700 feet high. It has a church, and some good springs. The inhabitants subsist by fishing, and the produce of the few fields which they cultivate, without having much to spare.

Immediately off the East end of the Praya de Marambaya is the great point of *Guaratiba*, at which begins the range of mountains that surround the Gulf of Rio Janeiro. From this point, in clear weather, at 7½ leagues to the East, may be clearly seen the isle *Redonda*, off the entrance, and the steep shores, in streaks of white and dark green, which terminate the coast. You may equally see, at about 6 leagues to the E.N.E., the *Gavia*, the mountain which, from its remarkable form, cannot be mistaken for any other, and which is the surest indication of Rio Janeiro, on approaching from the southward. On proceeding thence toward Rio no particular caution is required, and having come up nearly to Redonda, you may shape a course according to the wind, between it and the neighbouring islets; recollecting only, before entering, that it is requisite to have a wind which will carry you in before night; such wind commences about noon, the time of day when the breeze sets in from the offing, almost always with sufficient force.

The eastern point of Marambaya Island is separated from the main land by a small opening, through which boats only can enter into the gulf.

As the land of Marambaya is low, it should in thick weather be approached with caution. Circumspection is the more necessary, as the *Lagé*, or flat rock, surrounded by shoal ground, lies at 3 miles from shore, nearly off the middle of the isle, which should not, therefore, be approached nearer than to 4 miles, or in 22 to 30 fathoms of water, bottom of sand and gravel.*

M. Roussin, both in his Chart and Directory, describes the Gulfs of Marambaya and Gairosu under the general name of *Baie de Ilha Grande*, which he describes as having two entrances; the one to the East formed by the Ilha Grande, and promontory or beach of Marambaya, and the other by the same isle and Punta Joatinga. Both entrances have sufficient water for the largest ships. Entire fleets may enter and find shelter from all winds. The soundings vary from 27 to 6 fathoms in great part of the surface; and on several parts of the interior coast wood and water may easily be obtained.

The ILHA GRANDE, an island 5 leagues in length, separates the entrances of the extensive harbours of MARAMBAYA and GAIROSU, as shown on the chart. The interior land is high; and the greater part of the coast presents a double range of mountains. On leaving Rio, when bound this way, the mountain of Gavia serves as a guide to the westward. A sufficient offing must be given to the land after passing this point, as the current frequently sets strongly on the shore to the West.

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* A *Lage* means a flagstone, and is a generic name given by the Portuguese to flat rocks but little above the surface of the water, we presume that the 18 feet on this rock, as denoted in a late chart, must signify 18 feet high *above* the level of the sea.

The eastern end of the Ilha Grande lies at the distance of 47 miles from Point Gavia, and opposite to the bluff point of Marambaya Island. The channel between it and the latter is 5½ miles wide, and very safe for ships of any size, which may take shelter here. The soundings are from 15 to 9 and 7 fathoms. Fresh water may be obtained from the springs at the West end of Marambaya Island, and wood may be had from the other islands in the bay.

On the eastern side of the Ilha Grande is anchorage, in the several little bays named *Palmas*, *Albroo*, and *Eschella*, for ships of any burthen. The first of these, from the East, is Palmas Bay, and in this a ship may lie land-locked in from 6 to 8 fathoms. The other two are smaller; in both the depths are from 5 to 7 fathoms.

Within the Restinga or Isle of Marambaya the soundings eastward diminish from 8 to 3 and 2 fathoms. From the *Punta do Sena*, or N.W. extremity of the isle, a reef or tongue of sand extends nearly 3 miles N.N.W., or about two-thirds over the entrance, toward an islet called the *Gavia Grande*, which lies at the entrance of an opening near the North shore; so that the deep channel for ships is only 1 mile in breadth, and the course upward is between this isle and a group to the eastward, of which *Jaguano* is the chief. The best passage toward the eastern part of the gulf is made by keeping the main land on board, leaving the Jaguano group on the starboard side, and the two islands *Tacurucu* and *Madeira* on the port. There is anchorage at 1½ mile S E. ½ S. from the *River Taguai* in 5 or 6 fathoms, muddy ground, with the Island Madeira W.N.W. ½ W., 2½ miles, Tacurucu, W.S.W. ½ W., and Mount Marambaya, S.W.

On sailing outward from this spot keep the main land on board, and pass between Tacurucu and Fortada, or the N.E. isle of the Jaguano group. You may freely stand toward the Gavia Grande, but must be cautious in advancing toward the bank of Marambaya, proceeding in not less than 9 or 10 fathoms, as the edge of that bank is very steep.

Isle of Jorge Grego.—At about 2 miles from the South side of Ilha Grande is the islet of *Jorge Grego*, which is bold-to; and, although sterile in appearance, it affords not only anchorage on its North side for large ships, but plenty of wood and water; and here, at a village named *Angra do Reis*, refreshments may be obtained.

Gairosu Bay.—The entrance to this place, between the Ilha Grande, and Punta Joatinga, may be readily known by a remarkable inland hill to the northward, called the *Friar's Hood*. Bring this hill to bear N. by E. ½ E., and steer toward it, until you are 2½ miles within the point of the island, when you may bring up and anchor. By keeping within this distance from the island on the East you will avoid a sunken rock, which lies nearly in the middle of the entrance. On coming in, numerous isles, inclosed within the bay, will be seen; and between those on the East is a passage into the Gulf of Marambaya. The principal village, *Villa Grande*, is on the N.E. shore. The situation of an islet near Point Joatinga, on the West side of the entrance, is lat. 23° 18′ 30″, long. 44° 30′ 10″.

The Point of Joatinga and that of *Cairoçu*, which follows, at 5 miles more to the S.S.W., are high and steep, and may, therefore, be approached with safety. The points terminate the South part of the high lands which encompass the great bay of Ilha Grande, &c.

The Porcos, &c.—At 25 miles S.W. by W. ½ W. from Point Cairoçu is a group called the *Porcos*, or *Hog's Isles*, which comprehends one isle of moderate height, with three small islets, one on the South, the others to the N.E. Between the larger isle and the continent is a very fine channel, into which large vessels may enter and pass with perfect safety, but they should not venture in with a shifting wind. On several points of the coast within, cattle and refreshments, with wood and water, may be obtained. One of the best roadsteads hereabout is in a cove of Porcos, with 8 and 9 fathoms of water, sheltered from all winds, excepting those from N.E. to E. by N., which seldom continue so long as to cause a heavy sea. Here the tide is scarcely perceptible. Opposite to the Ilha de Porcos is the *Bahia de Tubaroes*, or Shark's Road, which has likewise good and clean ground, and is capable of admitting ships of burthen, but it is exposed to winds from the southward, which raise a heavy tumbling sea, dangerous to large vessels.

ISLAND of SAO SEBASTIAO, &c.—The N.E. point of the Island of *Sao Sebastiao*, or of *St. Sebastian*, is 13 miles S.W. by S. from Porcos; and there lie in the offing a group of three islets, called the *Busios*, and an island, *Vittoria*, nearer to St. Sebastian. The Busios lie at 11 miles S. by E. from Porcos, and at 6 miles W. 31° S. from these is the Isle Vittoria. The passage is clear for vessels of all dimensions between these several groups, and so is all the basin formed between the Island of St. Sebastian and the continent, with the exception that the channel between St. Sebastian and Vittoria is contracted by a reef extending 2 miles S.S.W. from the latter, and therefore vessels of more than a middling draught should not attempt it.

The Island of Sao Sebastiao, in its greatest extent, is about 4½ leagues in length, and its mountains are as elevated as those of the continent, from which it is separated by a gullet or strait. In clear weather this island may be seen at a distance of 15 leagues. Its shores are very steep; that of the South trends to the W.N.W. from the S.E. point of the isle. The eastern coast is altogether nearly in the direction of the meridian, and the isle is in form quadrilateral. The western coast opposite to the continent forms, with the latter, the gullet, and several deep bays, wherein there are excellent anchorages, bottom of oaze or mud, and depths of 7 to 22 fathoms.*

Those who are bound to Sao Sebastiao have seldom occasion to land, at any time either on the North or the South side of the island. What has been already said on the winds and currents off the coast, has shown what precautions are requisite on approaching. There are impediments which may not be expected; and the Baron Roussin has shown that even in the month of June, which is the middle of what is called the southern monsoon, having made the island from the South, he lost three days in tacking, in order to gain its North side; the winds being adverse and very fresh from the N.E., while the current was running to the South, at the rate of seven-tenths of a mile in the hour. The most prudent way seems, therefore, to be, not to attempt the approach from the southward, unless the weather proves fair, when the land may be seen and known.

Point Pirasonungo, the S.E. point of the island, is situate in lat. 20° 57′ 32″, and long. [*corrected*] 45° 11′ 40″.

The gullet or strait of St. Sebastian affords shelter and refreshments for the largest vessels. All should enter it from the northward, and keep near the island. Its general direction, halfway down, S.S.W. ½ W., and thence more westerly. It is contracted by a bank extending from the continental coast on the West, for more than two-thirds of its length from North to South. A particular plan of it is given on the chart, on reference to which it will be seen that, in the roadsteads on the island side, the depths are from 15 to 18, and that the depths in the channel vary from 10 to 20 fathoms; the bottom of muddy and tenacious ground. The greatest breadth of the strait is at the North part, 3 miles; but two-thirds of this space is occupied by the bank on the West, over which the depths are from 5 feet to 8 fathoms.

A roadstead more tranquil than that of St. Sebastian cannot be required; it being so protected by the surrounding high lands that vessels lie in water as smooth as in a basin.

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* In noticing this quality of ground, it may be here observed that, on the coast of Brasil, the bottom of oaze or soft mud is almost always found near the high lands.—*Roussin.*

At this island cattle, poultry, arrack, and the other provisions of tropical climates, may be readily obtained at a moderate price, either at the two principal establishments, or at the habitations of the country people, which are numerous, both on the island and the main. The fishery here is rarely productive, but the fish are of good quality.

The ancient town of St. Sebastian is on the continent, at the narrowest part of the strait. Since 1817 the Brasilians have projected a new town on the isle, toward the northern entrance, *Villa Bella de Princeza.* At 400 fathoms so the S.W. of this town is the best anchorage for ships of war, where there are 16 fathoms of water, bottom of gray sand.

There are several *watering places* at St. Sebastian, but the best is between the new town and the *armaçao,* or oil factory, situate near the N.W. point. The water is good, and easily obtained. On all the coast of the continent opposite fire wood is abundant.

The *winds* at St. Sebastian almost always follow the direction of the gullet, night excepted, when the land breezes come alternately from different points, without any certain law. During the day the winds come mostly from the N.N.E. and S.S.W., following the line of the coasts; they are frequently interrupted by intervals of calm.

The *currents* follow the same direction as the winds, and their velocity is proportioned to the force of the latter. The most ordinary rate in the gullet is seven-tenths of a mile in the hour, and of one and eight-tenths when augmented to their greatest strength.

The roadstead is situate in lat. 23° 47′ 26″, 45° 18′ 30″.

It has been noticed that the lands of St. Sebastian, with those of the vicinity, are very high; but they are all well covered with wood to their summits, and present an agreeable aspect. The shores are steep, and you may anchor at a short distance from them on good ground. In general there are no dangers but what may be seen.

The South entrance of the gullet is not above a mile wide, but it will admit ships of war, and afford shelter during a S.E. gale. On a survey of the strait by Mr. Warner, there appeared to be little or no regular set or rise and fall of the tide here; but the current, with northerly winds, sets to the southward, and with southerly winds to the northwards, as already described. There may, however, be a rise of 2 or 3 feet on the days of full and change, on which the time of high water has been estimated at 11ʰ.

ST. SEBASTIAN TO SANTOS.—From the S.W. end of St. Sebastian an islet, *Moela,* near the entrance of the Port of Santos, bears W. by S. 15½ leagues. In the great bay between, at 5 miles from the shore, lies a high, conical islet, woody to the summit, called *Montao de Trigo,* or the *Corn Stack,* in lat. 23° 51′ 4″, long. 45° 43′ 10″. At 2 or 3 miles around it, and to the same distance from the coast in the vicinity, is an excellent muddy bottom, having over it from 11 to 22 fathoms of water.

The group called the *Alcatrasses,* or *Cormorant Isles,* lies at 16 miles S.S.E. [*S.* 17° *E.*] from the Monton de Trigo. This group is composed of several arid rocks, the largest of which may be seen at the distance of 7 leagues. It appears from the E.S.E. in the form under which painters represent a dolphin, whereof the head, connected with two small rocks, turns to W.S.W. Another rock, larger than the two last, lies at 2 miles to the W.N.W., and two or three others lie nearly at the same distance to the N.E. The pilots say that the bottom near these rocks is not clear, and that it is imprudent to approach them within 4 or 5 miles, unless the wind be fair. This precaution is the more requisite, as the currents from the gullet and eastern side of St. Sebastian at times affect the sea hereabout. The assigned position of the principal isle of the Alcatrasses is lat. 24° 6′ 5″, long. 45° 38′. From the north-easternmost of these islets the *Point Seputuba,* or S.W. point of St. Sebastian's, bears N.E. ¾ E. 13 miles ; and the entrance of the Port of Santos nearly West, 13 leagues.

SANTOS.—As a particular plan of this harbour is given on the chart of the coast, a prolix description is unnecessary. On reference it will be seen that the other part is a circuitous bay, with a sandy beach, affording anchorage and shelter, perfectly clear and safe. The port, formerly much used by the Portuguese fleets, has declined in importance, together with the other southern ports, since the rise of Rio Janeiro, Bahia, and Pernambuco. The harbour is formed on the East by the island of St. Amaro, a portion of land separated from the continent by a small river, the *Bertioga*, which falls into the sea in that direction, in the parallel of 23° 54′ S. Through this river craft may still pass into the harbour of Santos.

The southern or chief entrance to the port of Santos admits large vessels, which may enter and be sheltered from all winds excepting those from S.S.W. to S.E. *Point Taypu*, on its western side, lies in lat. 24° 1′ 11″, long. 46° 21′ 43″.

Light.—The opposite point, *Manduba*, lies nearly on the same parallel, at a mile to the N.W. of an islet named *Moela* (or the *Gizzard*), which may be approached with safety. The lighthouse on Moela Island is a white tower, 40 feet high, which shows a bright fixed light, elevated 100 feet, and to be seen at 12 miles off.

On advancing into the bay from the southward, you will have 10, 9, 8, and 7 fathoms of water, until near the bar, upon which there are only 4½ and 5 fathoms. The passage within is narrow, but the eastern side is the boldest, having deep water close to the shore. At 6 miles up the river, on the eastern shore, and above the second bar, is a fort upon a perpendicular rock, near which is a depth of 18 fathoms. Having arrived to this place you will see the town of Santos to the West, on steering toward which, at 2 or 3 cables from shore, you will avoid the bank stretching from the North side; and when nearly up to the town you may anchor. The best spot is abreast of the town, in 7 fathoms, bottom of mud. Provisions are abundant here, and good water may be obtained by sending a boat about 7 miles thence up the river.

To the south-westward, between the port of Santos and the village of Conceiçao, a distance of 9 leagues, the shore is generally low; but a chain of high mountains extends within, which branch in different directions, and appear in the distant offing like islands. The chain is broken by the harbour of Santos, but continues to extend thence eastward to the gullet or strait of St. Sebastian.

Lagé or Rock of Conceiçao.—At 7 miles E. 25° S. [*E.* 31° *S.*] from the village of Conceiçao stands an insulated rock, about 12 feet high above the sea, which appears to be a little larger than a man-of-war's launch, and at a little distance from it are 12 fathoms of water, bottom of soft sand. From this place the port of Santos may be distinctly seen, at 7 leagues to the N.E.

The Lagé or Rock of Santos, otherwise called *Bird Isle*, is a block of smooth stone, about 6 feet above the sea. It lies in the lat. of 21° 18 at 16½ miles S. 20° E. from the islet Moela. Between it and the port of Santos the depths are 15 to 18 fathoms, bottom of sand and mud, the usual quality of ground hereabout.

Redonda or Little Queimada.—This is a small round islet, thickly wooded, and visible 20 miles off. It lies at the distance of 10 miles S. 39° W. from the Lagé of Conceiçao, in lat. 24° 21′ 26″, long. 46° 46′.

The Queimada Grande is a large rock, nearly barren, lying at about 10 miles to the S.E. from Redonda, in lat. 24° 28′ 21″. This islet has appeared in some charts under the name of Ilha Redonda, but this appears to be wrong; as it is described as long and narrow, extending about N.N.E. and S.S.W. nearly 2 miles, with a reef from its northern point. Its highest part, appearing of a round form, is to the S.W.*

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* A Rock, stated to lie in 25° 41′ 20″ S., and about 44° 50′ W. [*corrected*], was discovered

VII.—SANTOS TO THE RIO DE LA PLATA, INCLUSIVE.

Having described the islets in the offing of Santos, we now proceed with the coast from Conceiçao southward.

Conceiçao is situate on a hillock near the shore, and at 4 miles from it there is anchoring ground with 9 to 11 fathoms of water.

The coast hence, a low, sandy shore, trends to the S.W., 14 miles, to the creek, heights, and beach of *Piruibe;* thence follow in succession the islets and point of *Guaraha Una*, the little river *Una*, *Point Jurea*, the *River Iguape*, the entrance of the *Mar Pequeno de Iguape*, and the port of *Cananea*. The soundings along shore generally increase in depth according to the height of the lands; and there may be found, at from 3 to 10 miles off shore, 7 to 13 fathoms of water. You may anchor off any part of the shore, at 2 or 3 miles from the beach, on an excellent bottom, in from 5 to 9 fathoms; but as there are no harbours for large vessels, there can be no motive for anchoring here, unless in a calm, when not exposed to danger.

The entrance of the little river Iguape lies in lat. of 24° 35½′, and the bar of the Mar Pequeno is about 3½ leagues to the S.W. of it, in lat. 24° 43′. By the *Mar Pequeno*, or *Little Sea,* is meant a natural canal, which extends in a parallel direction with the shore to the port of Cananea; and the beachy coast between is, therefore, that of an island; this is called the Praya, or Beach of Iguape. In proceeding along it a vessel should not advance nearer than 2 leagues, nor into less than 9 to 11 fathoms of water, sandy bottom.

The Mar Pequeno de Iguape, above mentioned, has a sufficient depth for large vessels, but its bar will admit boats only. The town is situate on the western bank, at 4 miles above the entrance. The Praya is a low sandy flat, the middle part excepted, and can be seen but a little way off. Its extent is 10 leagues, and it consists mostly of sandy downs, interspersed with brushwood.

Mount Cardoz is the highest mountain on this part of the coast. Notwithstanding the shortness of the distance and the height of the chain of mountains of which Mount Cardoz constitutes a part, and predominates so remarkably, the fogs that prevail on this part of the coast, in the southern monsoon, obscure the land, and the coast should then be approached with great caution.

CANANEA.—An islet, Bom Abrigo, in lat. 25° 6′ 49″, and long. 47° 49′, distinguishes the entrance of the port of Cananea. It is very high, covered with trees, and vessels may anchor at a little distance from it to the eastward. A similar islet lies on the South side of it, 2 miles to the eastward of which are 10 and 11 fathoms of water, over a bottom of sand. The common channel into the harbour is to the northward of Bom Abrigo, although obstructed by several shoals, but the southern channel is the deepest; and a vessel may venture into either with the assistance of a pilot. The bar may be found by means of Mount Cardoz, situate inland about 5 leagues to the W.N.W., and by the Praya de Iguape, which we have described. Within the harbour the Brasilians construct large vessels. The town is situate on the western side of the river, at 7 miles above the Ilha do Abrigo.

On proceeding southward from Bom Abrigo you will see, at the distance of 10 miles from that isle, an islet, *Castillo*, 32 feet high above the water, and nearly oppo-

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on the 13th of February, 1811, by *Medeiros*, a pilot of Bahia, who was for about a year along with Captain Roussin, and in whom Captain R. considered all confidence might safely be placed. It is marked *doubtful* on the chart; but, if it exists, it lies about *S.* by *E.* (*true*) 35 leagues from the S.E. end of St. Sebastian's. It was again announced as having been seen July 14, 1865, by Captain Manton, of the Brasilian transport *Jose San Roman*, who *estimated* its position as being 30 miles E.N.E. of the above; but this second announcement is also very vague.

site to the mouth of a rivulet, *Arrapira*, no longer navigable. At 8¾ miles beyond this, in the same direction, is another, *Figueira*, 160 feet high. Both have obtained their names from their peculiar appearance; the first being less elevated than the latter, but seeming broader, with a ridge rising up in the middle, and at a distance resembling a castle. Figueira in shape resembles a fig; both are nearly barren, and bear from each other S. 28° W. and N. 28° E. (*by compass*). At the distance of a mile from each are from 13 to 9 fathoms, fine sandy ground.

PARANAGUA.—The *Isle do Mel*, or Honey Isle, marks the entrance of the gulf of Paranagua, which is surrounded by forests. This gulf, improperly called bay, is a break of the land in all directions, within a circuit of 5 leagues, and is the receptacle of waters from several brooks and rivulets. The entrance is sheltered and divided into two passages, by the isle above mentioned. This isle is low, and has several hummocks on it, which at some distance resemble islets. To the northward of it are three islets, named the *Palmas*. The southern passage, obstructed by breakers, is not navigable; the northern admits brigs, many of which are built in the gulf or basin. In entering by the northern passage you leave the Palmas on the starboard side. These may be known by the palm trees, with which they are covered; but here a pilot for the interior navigation is indispensable.

The water which issues from the gulf of Paranagua carries into the offing the alluvion of the country, which has sensibly reduced the depth, but there is nothing material to obstruct the navigation, and at 2 leagues from the entrances there is found from 5 to 8 fathoms of water, with bottom of grey sand and mud.

In addition to the information given above, we have been favoured with the following remarks by the late Capt. Robert von Bronikowski, in 1865:—

The coast adjoining the Bay of Paranagua, and particularly the entrance thereto, has been but very imperfectly surveyed, and for the guidance of shipmasters, to facilitate their safe approach on future occasions, I will give them a brief account of my own observations. In ordinary weather, the currents outside and within a few miles of the banks run parallel with the coast a regular ebb and flow, but with heavy breezes from the eastward, particularly S.E., they run violently towards the land, and a vessel caught in a S.E. gale close in-shore, and not knowing the entrance to Paranagua bay to run for, would certainly drift upon the banks and be wrecked. I advise ships bound to Paranagua to make the land a little to the South of the port, to avoid the dangerous bank E.N.E. of the entrance. This bank having only 1¾ fathom upon it at low water, is steep-to, the outside of it being 8, 9, and 10 fathoms. It is a treacherous shoal, extending 3 miles. East of Ilhos das Palmas. The sea does not break upon it in fine weather, but in an easterly gale the breakers are formidable. Its S.E. point is marked by a red buoy of small dimensions. Its southern edge extends in nearly a straight line from the red buoy to Palmas Island, which island can be seen at a distance of 15 miles, and cannot be mistaken, its top being covered with a number of small palm trees. This shoal is not spoken of in any book of directions, nor is it marked down in Laurie's chart of the coast of Brasil, although containing a special plan of the bay of Paranagua. The soundings likewise are very erroneous. The bar, which commences 1 mile West of the red buoy, and extends within a mile of the N.E. point of the Ilho do Mel, or Honey Island, has 3¾ fathoms upon at low water, and can, with a fair wind, be passed in all weathers, although the sea may be very rough upon it. Just over the bar are 7 fathoms, and within 4 cables' lengths W.S.W. of Palmas Islands 19 fathoms, from whence the water shoalens in a N.W. direction to 15, 13, and 12 fathoms.

In the bay, between the N.E. point of Ilho do Mel and the fort, there are 8 fathoms good anchorage. Along the North shore of this island are, within a short distance of land, 12, 12, 11, and 10 fathoms, but bad holding ground.

At the West end of Ilho do Mel are 8 fathoms, a very good and safe anchorage. Here the pilot, for the interior navigation, boards the ships. Ships entering the bay get a bar pilot near the red buoy, if the weather is fine: but it cannot be depended upon. I was myself close up to the N.E. point of Ilho do Mel, and had the bar a mile astern of me before a pilot boat hove in sight.

The approach to and entrance into Paranagua, with the accompanying plan and remarks, are not difficult. At the distance of at least 20 miles, in moderately clear weather, is seen to the South of the port, Coral Island, and the Itacalomi rocks; to the North Figueira Island, resembling a fig, as the name indicates. And approaching the coast a little, Ilho do Mel shows itself distinctly in four separate hummocks, appearing as four separate islands, of which only the southernmost is the island at the Barra da Sul, the coast between the three northern ones not being then visible. At a nearer approach the whole island heaves in sight, and on its middle and northern hummock two flagstaffs, and a signal flying at the northern one, indicating the approach of a vessel. Ilho das Palmas is then distinctly visible, the best and surest guide into Paranagua.

With the wind at S.E., keep Ilho do Mel close aboard: with northerly winds, stand without fear over to Ilho das Palmas, only keeping South of the line from the red buoy to Palmas Island. If close in-shore, and night comes on, and the weather looking fine, I would advise to anchor. The pilot most likely will board you before daylight.

There is another channel into Paranagua Bay at the Barra do Norte, but forbidden by Government to be used, and, without a pilot, I believe a dangerous navigation. At its mouth, I was told by the pilots, is a bar, with 3¾ fathoms upon it, and inside of it, in mid-channel, as much as 15 and 13 fathoms.

The tides at the entrance and in the Bay of Paranagua are very irregular; much influenced by the winds, and therefore of a greatly varying force. With strong winds from the eastward, the flood coming in will last often 2 and 3 hours longer than the ebb. Its velocity is 3 and 4 knots an hour. There is another phenomenon called *medias marés* (half-tides), where flood and ebb run only three hours, and the velocity only 2 and 3 knots, and even less. Strong winds may be looked for at the changes of the moon.

Fruit, sweet potatoes, and fish are abundant, and very reasonable; sugar and coffee not cheap. Harbour regulations are strict, government institutions and officials wanting a clean sweep; and if ever an English ship of war should enter Paranagua with hostile intention, her broad pendant would rouse the whole slave population to arms against their masters. That hope rests under many a black skin, and has been expressed to me on many occasions.

The summit of the southern hummock of the Isle do Mel is in lat. 25° 32′ 43″, long. 48° 16′.

The town of Paranagua is on the South side of the gulf, within the West end of an isle, *Colinga*, 4½ leagues from the entrance; and there is another town, the *Villa Antonina*, on the western inlet, 2½ leagues higher up.

RIVER GUARATUBA.—The bar of the river Guaratuba is 23 miles to the S.S.W. from the Isle do Mel, at the entrance of Paranagua. This bar lies at the southern extremity of a shallow bank, over which boats may pass, and which extends from the shore eastward to the distance of 3 to 8 miles. The bank begins at the southern pass of Paranagua, and on the edge of it, in lat. 25° 47′, is an islet, called *Ilha do Coral*, 64 feet high; and more to the southward two islets, called the *Itacolomis*, 21 feet in height, and lying in lat. 25° 50′ 20″, and long. 48° 24′. You may approach them from the offing to 1 or 2 miles, where there may be found 2 to 11 fathoms of water, bottom of sand and mud. The stream of the Guaratuba is rapid, and the vicinity has been noted for its fisheries. Several small rivers run into it, the principal of which is said to be navigable for 12 leagues.

At 16 miles S. by E. from the mouth of the Guaratuba is the point of *Joao Diaz*, the North point of the island of San Francisco, and which forms the eastern extremity of the river of that name. The islets of *Graça*, or *Garcia*, are on this parallel, at 2½ miles to the East of the point. The river is broad, but not very deep, and falls into the sea in a N.N.E. direction; the bay before its mouth affords anchorage in several depths, and at 2 leagues off there are 9 fathoms of water, over a bottom of fine sand.

The shore is flat, the lands in the environs not very high, but distinguished by some remarkable hills, and at a few leagues in the interior stand the *Serras de Maratuba*, a chain of very high mountains.

RIVER SAO FRANCISCO.—This river rises in the Serra Geral, or great chain of mountains in the interior, and after being augmented by various tributaries falls into the sea by two mouths, the northern called *Bobitanga*, or *Sao Francisco*, and the southern Aracary, between which is the Island of Sao Francisco. The northern is the only channel navigable for large vessels. The entrance to the Aracary is very dangerous, being obstructed by a sand bank—the only passage is by a narrow shifting channel 1¼ fathom deep, round which the sea breaks with violence.

Sao Francisco Island.—This island is of a triangular form, its greatest length being about 6 leagues and its breadth 3. It is generally flat, and watered by numerous streams. The surrounding country is low, but distinguished by several remarkable isolated hills. The Serra Geral is about 14 leagues distant in the interior. The North point of the island is called Joao Dias, in lat. 26° 6′ 33′ S., and is the highest land on this part of the coast North of Itapocoroya. The town of Sao Francisco (Nossa Senhora da Graça) is built on the South bank of the northern channel, about 3 leagues distant from the bar. It is small, and of little importance, and not open to foreign commerce, except for vessels bringing colonists for the settlement of *Dona Francisca* (Joinville). This colony of Germans is situated on the mainland about 5 leagues West of the town of Sao Francisco.

Directions for Entering.—If coming from the North, on making the Graça Islands, which lie about 2½ miles to the eastward of Point Joao Diaz, steer past the North end of the group, and not at a great distance, on account of a reef said to exist to the N.W., which can be passed in fine weather, but on which the sea breaks when stormy. Then stand to the North till you observe Point Sumidouro and the shore which extends to Point Joao Diaz; proceed towards Point Sumidouro, keeping the lead going, you will scarcely find two or three casts of 3 fathoms, immediately increasing to 4 and upwards; keep over to Point Sumidouro to avoid the bank on the North side, which advances into the channel, and on which the sea breaks heavily. Between Points Sumidouro and Joao Diaz there are from 3 to 10 fathoms, the greatest depth being near the former point. After passing Point Sumidouro keep the middle of the channel on account of the flat called the Coroa Grande, which stretches out from the South side. During winds from the sea, there is a heavy surf on this flat, and on the ebb the tides set towards it, it dries at low water. When in a line with Isle Alvarenga and Point da Cruz, you may stand for the anchorage in front of the town. Observe, that about 3 cables' lengths N.W. of this point, there is a rock having 1¼ fathom on it, and in front of the town there are 3 rocks, which are buoyed, or otherwise marked. From Point Sumidouro to the anchorage the soundings gradually diminish from 13 to 5 fathoms, bottom of mud.

If you are coming from the South, it is necessary to pass between the Islet of Jaguaratuba (which is about 1 mile to the northward and westward from the Morro da Enceada) and Graça Island. It must be observed that a vessel ought not to attempt to pass to the westward of Jagnaratuba, on account of the numerous rocks just awash on which the sea breaks, and the ebb tides run with great force towards the bay between Point Joao Diaz and the Morro da Enceada. The soundings on making for the entrance according to the above directions give from 10 to 4 fathoms, sandy bottom, the course being directed towards Joao Diaz, near which a vessel drawing 15 feet can pass at the distance of 2 cables' lengths, the depth decreasing to 3 fathoms when you are N. and S. with this point. Proceed till the point bears S.E., and as soon as you are in 5 or 6 fathoms stand over for Point Sumidouro, then follow the directions for vessels coming from the North. The entrance of the channel is only practicable with a fair wind; but it is said a vessel can go out with the ebb tide, with any wind.

At spring tides the current runs from 3 to 4 miles an hour, and it is observed that 2 or 3 hours after the tides begin to flow, the current stops, and some time afterwards continues its course: this is called half-tides (medias maiés).

The land breezes blow from W.S.W. to S.W. from March to September, and during the remainder of the year from W.N.W. and N.W. The winds from the N.E., S.W., and W. raise a sea, but it goes down as the wind dies away.

At new and full moon the tides rise about 6 feet, and at the quarters 3 feet.

At 4 leagues South from the Garça Islets is another group, called the *Tamboretes* at about 2 miles from the nearest shore. Five miles to the S.S.W. of the latter are the *Remedios Islets* and the *Lobos Tupilingo*, situate off the mouth of the *Aracary*, or southern branch of the Rio San Francisco. All these islets are covered with trees, and small vessels only pass between them and the shore.

From the Aracary to the Point *Itapacoroya*, the low coast, in an extent of 8 leagues, forms a slender bay, broken only by one small river, the Itapucu. In the southern part of this bay are the Itacolomi Rocks, 16 feet above water, and the *Feya*, of 32 feet. Here, also, is an armaçao. Near the islets you may anchor and obtain fresh water, sheltered from winds between the South and West.

Between the Point Itapacoroya and the Island of Santa Catharina, or Saint Catharine, the coast forms several bays, receptacles of the waters of five small rivers. In the last of these, to the N.W. of St. Catharine's, named *Tijoucas Bay*, there is good anchorage.

In September, 1831, H.M.S. *Volage*, on her passage to St. Catharine's, struck soundings in 14 fathoms, bottom of mud, in lat. 26° 44', and long. [*corrected*] 48° 5'. From thence, while the ship was sailing 2 miles W. by S., bottom was found with 14 to 12½ fathoms; after which, on steering West and W.S.W., the water deepened suddenly to 23 and 29 fathoms; and these depths were preserved until the Isle Arvoredo, at the North end of St. Catharine's Island, was passed. These soundings are represented on the chart. The variation here is now 3° East.

On approaching St. Catharine's from the northward, several small islets will be seen. The largest is that named *Arvoredo*, in lat. 27° 16' 47", long. 48° 20'. The channels between are perfectly safe; the depths varying from 22 to 11 fathoms, bottom of oaze and grey sand; taking care only to avoid the rock and breaker of San Pedro, which is situate at about 3,000 toises or fathoms W.N.W. from Avoredo. You may range along the points of land to the north-westward of these isles, named Zamba, Bombas, Garopas, and Camboriu, at the distance of 2 or 3 miles.

ISLAND OF ST. CATHARINE.—This island, which forms an excellent harbour, lies between the lat. of 27° 22' and 27° 50' S. It is 9 leagues in length, and its greatest breadth is 10 miles.

Of the harbour Admiral Krusenstern has said:—"The entrance is as easy as possible. The islands Gal and Alvoredo (at the entrance) are not to be mistaken; the first, which is the smallest and lies most to the northward, is particularly remarkable by its long white streaks on the steep side, as well as by two small rocks, which lie at the N.E. extremity. At the distance of about 9 miles the depth is 30 fathoms, and gradually decreases. In coming from the northward it is best to steer between the islands Gal and Arvoredo, leaving the small rocky islet S. Pedro on the right. The latter lies 3 miles W.N.W. of Arvoredo. The anchorage is perfectly safe everywhere, whether to the northward or southward of the Fort Santa Cruz, which stands at the entrance; yet it is better to anchor to the southward, as well on account of communication with the town, as of the vicinity to the village of S. Miguel, where the best water is to be procured. In coming to St. Catharine's from the southward, you steer between the Island of Avoredo and that of St. Catharine. The passage is perfectly safe. If the wind should be contrary, a ship may work in without danger; for close to St. Catharine's there are 4 fathoms of water, and the coast toward Avoredo is equally deep.

"The observations on the tides were made on the island of *Anhatomirim*, where the observatory was erected by Dr. Horner. The following are the remarks which he communicated to me on this subject.

"The ebb and flood are here very unsettled, and depend entirely on the wind. The flood sets in from the North, the ebb from the South; and, as the wind is almost always from the sea, the ebb, with a fresh northerly wind, is scarcely apparent, and seldom lasts more than two or three hours. The water continues sometimes at its height for three or four hours together, during which no change whatever was perceptible, either in its increase or decrease. The lowest tide we had was on the 27th of January, 1804, one day after the full moon, with a fresh North wind; and the highest tide, which rose 3 feet, was two days after the full moon, with a very moderate N.E. wind. A southerly wind kept the water up above an hour.

"The variation of the needle, which Frezier, in 1712, found to be 10° E., we found by a mean of two compasses, 7° 50′ E." * It is now about 3° E.

The Baron Roussin says, that the island of St. Catharine is sufficiently elevated to be seen in clear weather at the distance of 15 leagues. At this distance is found 62 fathoms of water, and this depth diminishes to 4 cables from the coast, where there are only 4 fathoms.

On approaching from the East, the island appears in very irregular heights, being intersected by mountains separated by deep valleys; the greatest elevation is from North to South, and the mountains of the continent beyond it are a little more elevated than that of the island. You will particularly distinguish among them the *Morro de Cumborella*, a branch of the eastern *Cordilheiras*, extending from St. Catharine's to Rio Janeiro.

About the middle of the isle, near the sea, is a large lagoon, under the high lands, which presents an apparent opening that may serve as a landfall. When at 3 leagues from the eastern coast you bring this opening to the West, the N.E. point of the isle will bear about N.W. at 3 leagues.

All the exterior coast is clean and moderately steep, and you may range along it without danger, passing several large rocks which lie off it, as hereafter described.

The island may be navigated all round, and it presents numerous anchorages between its western coast and the continent, but the North part of the intervening channel is the part most fit for vessels drawing much water, and it is, therefore, that generally used. This passage is rather less than 2 leagues broad, is clear of danger, and on coming in you may advance to either side, only observing to keep clear of the *Northern Molequez*, large rocks which lie to the S.E. of Point Rapa, the North point of the island. This channel hence is clear, and you may beat up to either shore without risk, in from 40 to 28 feet of water.

Having advanced within the strait you may anchor in any part according to the vessel's draught, and in keeping near mid-channel the depth will be sufficient for large ships when at a mile S. by E. from the little Isle Anhatomirim, on which the fort of Santa Cruz is built. Passing this point, on advancing to the south-westward, the depth gradually decreases to 15 and 12 feet; and to the southward of the Raton Islets, lying on the eastern side, there is not more than 10 or 12 feet of water. In the large bay to the West, called the *Sacco Grande*, the depths are still less; this bay is a tranquil place, frequented mostly by vessels employed in the whale fishery off the coast, and is well adapted for small vessels.

The bottom is of mud, in almost all the anchorages of the gullet. From that which vessels of war mostly frequent, the following are the bearings by compass.

Point Rapa, the North point of St. Catharine's N. 62⅛° E.; middle of the fort Santa Cruz, N. 56⅛° E.; Fort of St. José, near the N.W. point of St. Catharine's, N.

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* From the survey of the Isle and Strait of St. Catharine, made by Captain Barral of the French Navy, in 1831, it appears that the rise of tide is from 4 to 6 feet. High water at 2^h 15^m.

62⅓° E.; and Point of the Armaçao, on the continent, N. 9° 50′ E., allowing a variation of 7° E. The depth is about 5½ fathoms, and the bottom greenish mud, good holding ground. This place is generally smooth, being sheltered by the high lands around. The only open direction is N.W., but the winds from this direction are seldom strong.

There are several good watering places hereabout; the best is at 2 miles to the North of the isle Anhatomirim, on the continent, where plenty of excellent water may be obtained without expense, either day or night, and permission may be obtained for cutting firewood, either on the continent or on one of the Raton Isles.

When you obtain wood from this country, and from the coasts of Brasil generally, it is best to prefer the young trees; the old trunks, commonly hollow, being mostly filled with insects and eggs of venomous reptiles, which might be injurious on board. It will be prudent to immerse the wood in the sea before hoisting it on the deck.

The most common winds in the gullet follow the direction of the strait, either in one way or the other, but they are seldom violent, and the storms are not dangerous to vessels which are well moored. From March to September, which is the season here called the winter or southern monsoon, the winds in the vicinity of the isle blow generally from the South to S.W.; sometimes very strong, and accompanied with rain; but these violent crises do not exceed more than 48 hours.

Toward the month of October the winds approach the East and the North; the six following months constitute the summer, and are the hottest of the year. There are then frequent storms, which come from the North to the S.E. by the West; and when, in this season, the winds descend from the S.E., they are accompanied with considerable rain; but in general the greatest quantity of rain falls during the months of August and September; but even at this period some years have been exempted.

The tides are regular in the gullet, but it has been remarked that, as they enter by the North and South at the same time, meeting in the roadstead near the town, they return in a similar way, with greater or less velocity as they may be accelerated or retarded by the prevailing wind. The mean velocity of the current rarely exceeds three-tenths of a mile in the hour at half tide, and the difference of level in ordinary tides is not more than 3 feet. In the syzygies, however, the current frequently runs at the rate of a mile and a half, and then the water rises and falls 5 or 6 feet. The time of high water, on the full and change, is $2^h 40^m$.

Should circumstances require you to seek the protection of the forts, this anchorage will not answer your purpose, and you must seek for that advantage either under the fort of Santa Cruz, on the Isle of Anhatomirim, that of St. José, on the Isle of St. Catharine, or the Fort Raton, on the largest of the two islets of that name; but the shot of these fortifications does not cross effectually from either point, at least with the artillery with which they are at present armed.

The governor of the province resides in the town of Nossa Senhora do Desterro, which is situate at about 10 miles S. by E. from islet Anhatomirim, on the narrow of the strait, about halfway down the island. This place, which is well sheltered, may be reached at all times by small vessels, and the communications between all the points are quickly made. At the anchorage, half a mile before the town, the depth at low water is 20 feet.

The approach to St. Catharine's may be made indifferently on the parallels between 27° 30′ and 28°. The winds and currents in the offing are not such as to cause much error in the route; but at all times you should prefer making the southern part of the isle in the southern monsoon, and that of the North on the contrary.

The southern part of St. Catharine's and the coast to the southward were not surveyed by Captain Roussin, and in consequence M. Barral, commander of the gabare or surveying vessel *L'Emulation*, was charged with continuing the work, and surveying the Rio Plata. This mission extended from March, 1830 to 1832.

The description of St. Catharine's agrees with that of the Baron Roussin. The lands of the island and of the adjacent continent to Cape Santa Marta Grande are very high and woody. The highest mountains which are seen beyond the island are in the chain of *Cubatao*; they are covered with clouds during the prevalence of southerly winds, but are clear with winds from the N.E. In the offing, at 12 leagues from the island, there are soundings of 62 to 72 fathoms, with a muddy bottom. On approaching, the depth gradually decreases. At a distance of 3 leagues are 33 to 35 fathoms, and 18 to 28 at 4 miles.

The *Isle Arvoredo*, at the northern entrance, which is high, has two sugarloaf summits, which are first seen on approaching. The islet Badejo, 8 miles to the southward of Arvoredo, is destitute of vegetation.

A vessel drawing not more than 14 feet of water, and entering by the North passage for the town N. S. Desterro, having passed the North end of the island, should be guided by the following indications.

Steer for the Cape Quebra Cabaço, on the continent, leaving the two islets Ratones on the port side, at 1½ mile or less. The coast toward the island of Anhatomirim will be about S.W. by W., and thence S.W. by S.

When you bring the little or southern Raton to bear E. ½ N. [*East*] at 2 miles off change the course to S.E., and continue it thus for 3 miles, passing a rocky flat, *Ipatitinga do Norte*, off Cape Quebra Cabeço, on the starboard side. On these rocks are only 4 or 5 feet at low water. When you have brought the cape to the South of these rocks, bearing W.N.W., the route is to the S.W., until you bring the rocks N.N.W. ½ W.

You then steer to the south-westward about half a league, so as to pass at 4 or 5 cables to the eastward of a rock near *Cape Henriques*, which being a woody cape, is thus distinguished from Quebra Cabaço; next proceed south-eastward, toward the narrow part of the strait, leaving the islet and point *do Lial*, on the western side, at the distance of 3 or 4 cables. Steering hence, S. by E. you enter the Little Strait or Narrows, which is commanded on the left by *Fort Santa Anna*, and on the right by the battery of *San Joao*. Here you will find from 11 to 16 fathoms of water, and will perceive, in advancing, the islets *Gata* and *Das Vinhas*, at the extremities of the cove on which the town is built. You leave the first on the left, and may then cast anchor in 20 to 21 feet of water, with the islet Gato bearing N.N.E., Das Vinhas S.S.E., and the steeples of the cathedral N.E,

The city N. S. do Desterro is situate in lat. 27° 35′ 25″, long. [*corrected*] 48° 29′ 16″.

At times, on coming from the northward to the town, there are found spots of 7 feet of water, but the oaze has 5 feet of depth at least, and the vessel will not be injured. With high water the *Emulation*, which drew 14 feet, came up to the town in three days. When the water was low, and the stream weak, she anchored.

EASTERN COAST OF ST. CATHARINE'S.—All the eastern coast is clean, but off the points, at some distance, are several rocks and islets above water; these are, the Northern Moleques, the Islet Badejo, before mentioned, the two Aranhas, the Isle Xavier, Ilha do Campexe, the Southern Moleques,* the Tres Irmaos, or Three Brothers, the Papagaios Isles, the Fort Isle, at the entrance of the southern passage, and the Isle dos Cardos, within the same.

The *Emulation* proceeded along the coast at the distance of 3 or 4 miles, and passed between the Irmaos and the Southern Moleques in 15 fathoms of water. The only obstructions are the islets and rocks above mentioned, which may be seen at 3 leagues off, and about which there are 13 fathoms. At the Isle do Campexe you may find anchorage, sheltered from southerly winds.

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* The *Isle Xavier* is of moderate elevation and flat on the summit. The *Southern Moleques* are three great whitish rocks, touching each other, and forming what is otherwise called the *Grande Moleque*.

THE SOUTHERN PASSAGE.—The southern entrance into the strait or gullet of St. Catharine's lies between the S.W. extremity of the island, *Point dos Naufragados* and the Fort Isle, a very narrow passage, but in which there are 17 fathoms of water.

When you enter from the southward you should have a leading wind, rising tide, and fair weather, without which the current may carry you on the Fort Isle, or on the opposite point, which are less than 300 fathoms apart. The vessel should not draw more than 15 feet. On coming from the southward you steer toward the Fort Isle, and, when you have the Papagaios on your left, you will see the Iramaos to the right. On passing hence, north-westward, the pass between the Fort Isle and Point Naufragados will be open. Having passed through, on a West course, you change the course to North, and pass the islet *Cardos*, which is remarkable for an insulated tree which stands on its summit.

You pass to the eastward of Cardos at the distance of 1 or 2 cables, and then proceed north-westward toward the *Enceado do Brito*, to the distance of half a mile; and thence North, along the western shore to the point of *Pesqueiro Fondo*, at the distance of 4 cables. Thus you will leave, on the western side, the village of Enceado do Brito; and further on a cluster of houses and cottages, forming the little hamlet of Cedros. On your right, at a distance, you may see the village of *Riberao* or *San Lapa*, on the Island of St. Catharine, and nearly before you will be an islet, the *Ilha do Largo*.

Before arriving at the last you will have passed a flat of dangerous rocks, beyond which you will be when the steeples of the cathedral appear on the western part of the islet Largo, and the West point of Cardos is on the fort of the South bar.

From off the Isle do Largo continue your course N. ½ W. until an islet, *des Cascas*, bears West; thence proceed toward the steeples of the city up to the anchorage between the islets do Gato and das Vinhas, which have been described.

THE COAST SOUTHWARD OF ST. CATHARINE'S.

Under Point Pinheira, which lies at the distance of 2½ miles from the South end of St. Catharine's, is a good anchorage, sheltered from southerly winds. At 2½ miles from the outer extremity of this point is an islet, the *Ilha do Coral*, extending North and South; and when seen in this direction it appears of a round form. It is covered with trees, is about three-quarters of a mile in length, and is a useful mark for vessels bound in by the southern passage. Its situation is lat. 27° 55′ 10″, long. 48° 29′ 10″. Between this islet and the Cape St. Marta Grande, in lat. 28° 39′, are other islets, which lie off shore as follow:—

The Ilha das Araras, to the S.E. of Point Bituba, lat. 28° 18′ 0″, long. 48° 41′ 32″.

The Islet Tocoromi, a high and steep rock, to the S.E. of the Ilha Araras, lat. 28° 19′ 29″, long. 48° 30′ 30″.

The Islet dos Labos de la Laguna, to the S.E. of the Araras and Tocoromi, lat. 28° 24′ 36″, long. 48° 40′.

At Point Bituba begins the beach, within which is a lake and the towns of *Villa Nova*, *Santa Anna*, and *La Laguna*. The last has some trade with Rio Janeiro, and is situate at the South part of the lake, at a mile to the N.W. of the bar, in lat. 28° 28′ 34″, and long. 48° 45′ 24″. At la Laguana is anchorage, practicable only for small vessels drawing under 7 or 8 feet of water, as there is a bar at the entrance.

The Cape Santa Marta Grande is the final termination of the line of mountains extending within shore to the northward, and is remarkable by having on its summit several great white rocks, which from a distance appear like an assemblage of houses.

Between Cape Santa Marta Grando and the bar of the Rio Grande de San Pedro, an extent of about 95 leagues, the coast is extremely low, and variegated only by sandhills and stunted bushes. It can hardly be seen, in clear weather, from the masthead, at the distance of 7 or 8 miles, and from the deck at not more than 3 miles; the first part, from the North, trends nearly S.W. This part is called the Praya, or Beach of *Torres*; it begins in long. 48° 44′ 56″, and ends in 49° 55′ 52″. The second part trends N. by E. and S. by W., and is called the Praya, or *Beach of Fernambuco*. Its eastern part begins with the termination of the former in lat. 29° 52′, and it extends to long. 54° 34′ 52″. The third part trends nearly S.W., and is known under the name of the *Praya do Destreito*, from lat. 31° 12′ to the mouth of the Rio Grande de San Pedro.

When to the southward of Cape Santa Marta Grande, you may see, in running along, a chain of mountains extending westward about 15 leagues from the sea into the interior country, and disappearing at *Torres*, which stands 25 leagues from the cape in lat. 29° 28′. The beach here may be approached to the distance of 3 or 4 miles, and was coasted at this distance by the *Emulation*; but there were no marks on shore fit for triangulation, and the situation of the vessel was ascertained by frequent observation, and estimated distance from shore.

Twenty-seven fathoms of water, bottom of sand, mud and shells, were found at 4 miles to the South of Cape Santa Marta Grande, and beyond that in going to Torres, the water diminished to 4½ fathoms near the shore. We may judge of the decrease of bottom in remarking that from the 27 fathoms to the 4½ there is a distance of 25 leagues.

The Praya do Fernambuco, between the parallels of 30° and 31°, is more steep than that of Torres. The *Emulation* found 35 fathoms of water, bottom of mud and sand, at 4 or 5 miles from the shore. On sailing out in the offing, to the distance of 15 leagues, the depths of water increase progressively to 85 fathoms, soft sand. Passing this limit there was no bottom at 91 fathoms. At 10 leagues out the depth is about 74 fathoms.

The Praya do Destreito terminates at the Rio Grande de San Pedro, as before mentioned. From 9 to 13 fathoms were found in coasting along it, at 3 or 4 miles. At this distance the *Emulation* ran 17 leagues, over a bottom of sand. The shore is not higher than that of Fernambuco, but there are some sandhills more elevated, and there is more vegetation.

In the offing, at 20 or 24 leagues S.E. from this beach, are 34 and 35 fathoms of water, bottom of mud and sand, and on approaching land the depths gradually diminish.

We may remark that the beach of Fernambuco, the central beach of the three, has most water near the shore and in the offing; while, on the contrary, that of Destreito is that which has the least.

RIO GRANDE DE SAN PEDRO.—The district of the Rio Grande de San Pedro is of great importance to the northern parts of Brasil. Its port being the channel of communication with a rich interior, which supplies pulse, grain, and other productions. It includes the whole of the great lake called the *Lagoa dos Patos*, and of the rivers which fall into it, from the North and West. The bar is represented in lat. 32° 9′, and long. 52° 4′. The entrance is shoal and difficult, and the bar frequently shifts; but after passing the latter you enter the *Lake*, and may then take a berth, or navigate as convenient.

LIGHTHOUSE.—Before giving instructions for entering this port, which, from its shifting nature, cannot be implicitly followed, as will be seen by the following directions arranged in the order of time, it will be necessary to state that a new *iron lighthouse* has been constructed, and was first used on January 1, 1852. It is 99 feet high, is painted red, and bears from the old one mentioned below, N. 23° W., by compass, 270 feet distant. One lighthouse cannot be well mistaken for the other, as the new one is 33 feet higher than the former one. It shows a REVOLVING LIGHT of the first order every minute, visible from 15 to 22 miles off.

The old lighthouse, used as a signal tower, is a square white structure, which is conspicuous.

DIRECTIONS FOR APPROACHING.—1st. By Captain Wm. Grant. Finding yourself in lat. 31° 30′ S., and having N.E., E.N.E., or easterly winds (any other winds may be dangerous, that is, from the sea), you may stand with security for the land [see the note on *Reid Shoal* below*], steering W.S.W., until you find youself in 13 fathoms, you will see the land, if to the northward of the bar; but if you have passed it, you will not, as the bank to the southward stretches out to a greater distance; and you cannot see the land unless when you are in 8 fathoms, and then barely.

The land, about 31° 40′, you will know by several tufts of trees pretty high and rounding to the northward; and, standing along shore, steering S.W., you will see sundry straggling tufts, but not so high. Here, if it be very clear weather, you may see houses, which will appear in the opening of the trees. You may then stand along shore with safety, keeping in from 10 to 9 or 8 fathoms. Losing sight of the trees and houses, you will see some mountains of sand, and an entire sandy beach; and when you are within two leagues of the bar, you will see tufts of trees, and find the soundings decrease, with a bottom of mud and red shells. You must now keep in 8 fathoms, but not less, as the water sets right on shore when close to the beach. The lead must now be kept going until you find soft mud, when you will find yourself close to the bar, which may be known by seeing several stakes along the beach. You must then haul up and steer South, to keep clear of the bank. You may easily know the bank, by the seas breaking over it, particularly from the eastward.

2nd. Directions by Captain James Harrison:—

"No vessel should attempt to enter if drawing more than 10½ or 11 feet of water, and she must have a leading wind in order to cross the bar.

"The land ought to be made to the N.E. of the bar, in about lat. 32° S. There is no difficulty in doing this, as the soundings are perfectly regular, about 60 fathoms at 60 miles' distance, and shoaling very gradually. When in 10 or 11 fathoms you will see the land. It is not advisable to get in-shore to the southward of the bar.

"In general, but not always, the bottom is mud to the southward, and abreast of the bar, whilst it is usually sand to the northward; and if to the southward of the port, the land will not be seen till you are in 7 or 8 fathoms. I do not know of any marks to tell how far you are from the port, as the whole shore consists of low sandhills, interspersed with bushes, and these hills alter their shapes with every gale of wind. The town of *Estreito* lies about 30 miles N.E. of the bar, but you must be close in-shore to see it. This is the only object which breaks the sameness in the appearance of the coast for many miles. The latitude is the best guide.

"After making the land, run down at a convenient distance, till you see a square white tower, which stands at the entrance of the harbour and the red lighthouse. These are very conspicuous objects, making like a sail at a distance, and may be seen some time before the land about them. So soon as you see the tower distinctly, hoist the signal corresponding to your draught of water at the fore, as presently explained. When you get down to within 3 or 4 miles of the tower, haul in-shore into 4½ fathoms, if a commanding breeze, or you may bring the tower to bear W.N.W. ¾ W., and steer for it; when you will soon see the boat at anchor on the bar, with the signal corresponding to the depth of water on the bar, flying at her mast-head.

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* In proceeding, as above, toward Rio Grande, caution is necessary, as it appears that a shoal lies in the track from the north-eastward, "Reid Shoal, Brasil." The following has been communicated in a letter from Mr. Reid, of the brig *Sweet Home*, of Aberdeen, dated Rio Grande, March 14th, 1842. The vessel, on her voyage from Liverpool to that port, struck on a shoal, in lat. 31° 3′ S., and long. 49° 47′ W., at least 40 (?) miles off the Brasilian coast. Luckily there was no sea on, and the wind was N.E. by E., which enabled her to clear the shoal immediately, making but little water. After his arrival at Rio Grande the master of the *Sweet Home* ascertained that a Brasilian schooner had grounded on the same reef a short time before. The reef or shoal was not laid down in any chart, and lies immediately in the track of vessels bound to that port."—*Shipping Gazette, July 1st*, 1843

"There are no regular tides in the Rio Grande; the current commonly runs with the wind; and, as in the river Plata, and I believe all along this coast, S.W. winds raise the water, and north-easters depress it; consequently a vessel may load in the port to 12 feet, as there is almost always plenty of water with the S.W. wind which blows right over the bar.

"The S.W. storms, called *Pamperos* by the Buenos Ayreans, and *Rebojos* by the Brasilians, blow furiously here in winter, about the full and change. They usually come on in a sudden gust, though the appearance of the sky gives sufficient warning for some time first, and blow very hard indeed for five or six hours, when the wind decreases, and a few days of very fine weather succeed. Sometimes they draw round to the South and S.E. before the wind abates, which renders it highly dangerous for a vessel near the coast. As the water is shoal there is a deep ground swell, which sets a ship very fast in-shore. The signals are made in palms, each palm being 8⅗ inches.*

A commander, in 1862, writes:—Vessels proceeding to the above-named port, should not draw more than 11 feet water. With that draught vessels are often detained more than a fortnight, for an opportunity to go over the bar. The highest water (there being no tide) is raised by the pamperos (or S.W. wind), and if the wind is strong, it causes a very high sea on the bar, when vessels cannot enter; should the wind veer to the S.E. (which it sometimes does), and blow hard, the sea rises very quickly, the water being shallow, and it becomes very dangerous for deep-laden vessels; consequently many vessels are lost on the coast, in the neighbourhood of the port. It is advisable for vessels of 10 feet to take steam, unless there is a fair wind with a good breeze, but not to miss an opportunity, if it is possible, to get in. If a vessel going in without steam, not having the signal for a steamer (which is the national flag over the flags for draught of water), should get on shore, the steamer that tows her off will demand 5 per cent. on the value of ship, cargo, and freight. Vessels leaving should not draw more than 10½ feet. With that draught they are often detained more than a fortnight. Vessels drawing from 11 to 11½ feet were detained in the months of March, April, and May, 60 days for an opportunity to get to sea. There are two good steam tugs, one of them very powerful, with disconnecting engines. They use their own tow-ropes, which are very good. The charge for towing in, over the bar, is 800 reis per ton (Brasilian); but if taken in tow more than two miles from the bar (which is optional), 1,000 reis per ton; if more than four miles 1,200 reis per ton. For towing out, 640 reis per ton; but if the vessel was not towed in, 800 reis per ton. A vessel is not charged towage for more than 250 tons. The Brasilian measurement for tonnage is from 35 to 40 per cent. more than British. All foreign vessels on arrival, except those with general cargoes, and vessels of light draught, proceed to the anchorage of San Jose do Norte, where vessels with salt (which is the principal thing imported) discharge their cargoes. Vessels with coals are ordered by the merchants to the town of Rio Grande (distant about three miles), to discharge; but the vessel should be lightened to 9½ feet. With that draught vessels are often detained more than a week in the channel, as the average depth is less than 9 feet. The channel is very narrow, and a vessel cannot sail through without a fair wind; if a steamer is employed, the charge is 400 reis per ton.

Port Regulations and Signals.—The channel or channels of the bar off Rio Grande do Sul are subject to constant changes, caused by the shifting nature of the sand-banks forming the same, which, being composed of very fine sand, are acted upon more or less by the winds and currents. The variation in the depth of water on the bar during the day is from 3 to 4 feet, being chiefly affected by the tidal influence and the winds—the greatest depth seldom exceeding 14 feet; it is not, however, prudent for vessels to load to a greater draught than 11 to 12 feet—and even at this draught, whenever the prevailing winds are from S.E. and E.S.E., it frequently happens that such vessels must lay off and on, outside, from five to ten days.

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* In former editions the palmo was stated to be 9 inches English, which led to difficulties from vessels hoisting the signal for less water than they actually drew. The palmo is 0·717 of an English foot.

The following is a description of a system of Telegraphic Signals, which, on and after the 1st of July, 1859, has been made on the flagstaff on the top of the square tower at the Bar of Rio Grande do Sul—and which signals are for the convenience of vessels outside the bar, waiting to come in. Vessels should recognise the signals by dipping their ensign twice. All the signals are made with *blue* balls and *blue* pendants:—

SIGNAL.	SIGNIFIES.
No. 1. Blue ball at flagstaff yard-arm.	Keep in the waters of the bar.
2. Blue pendant at flagstaff yard-arm.	Luff (or manœuvre conveniently); you are to leeward of the bar.
3. Two blue balls at flagstaff yard-arm.	Try to keep away; you are to windward.
4. Two blue pendants at flagstaff yard-arm.	Stand out to sea: you are near the shore.
5. Blue ball above blue pendant at flagstaff yard-arm.	Stand out to sea; you are near the bank.
6. Blue pendant above blue ball at flagstaff yard-arm.	Stand out to sea; it threatens bad weather from S.E.
7. Blue ball above two blue pendants at flagstaff yard-arm.	Take care: with your present holding you will run aground.
8. Blue ball between blue pendants at flagstaff yard-arm.	Anchor to the North of the bar at the proper distance from the shore.
9. One blue ball at each end of flagstaff yard-arm.	Anchor to the South of the bar in 6 to 8 fathoms water.
10. Blue ball at one end, and blue pendant at the other end of flagstaff yard-arm.	Press on sail, to see if you can come in.
11. Blue ball at one end, and two blue pendants at the other end of flagstaff yard-arm.	The signal for entry is only for those vessels whose draft of water corresponds to the number of palms denoted by flags on the tower.
12. Blue ball at one end, and blue ball above blue pendant at the other end of flagstaff yard-arm.	It is not possible for you to come in at present, on account of the state of the bar.
13. Blue ball at one end, and blue pendant above blue ball at the other end of flagstaff yard-arm.	You can only enter by being towed in.
14. Blue ball at one end, and blue ball above two blue pendants at the other end of flagstaff yard-arm.	You cannot come in at present; the wind is too light and current too strong.
15. Blue ball at one end, and blue ball with a blue pendant above and below it at the other end of flagstaff yard-arm.	The assistance you require is getting ready.
16. Blue pendant at each end of flagstaff yard-arm.	Come near the bar, the bar-boat is on the bank; or the tug-boat is going out.
17. Two blue balls at one end, and blue pendant at the other end of flagstaff yard-arm.	Steer toward the craft which is taking out the assistance asked for.

No. 18.	Blue pendant at one end, and blue ball above blue pendant at the other end of flagstaff yard-arm.	The vessel that asked for a pilot must steer towards the craft that is taking him one.
19.	Blue pendant at one end, and blue pendant above blue ball at the other end of flagstaff yard-arm.	Pay due attention to the signals on the tower, as the bar-boat cannot go to the bank.
20.	Two blue balls on one end, and two blue pendants at the other end of flagstaff yard-arm.	After dark, pay proper attention to the lights on the bar-boat on the bank.
21.	Blue ball above blue pendant at each end of flagstaff yard-arm.	There is no tug-boat just now at the bar.
22.	Blue pendant above blue ball at each end of flagstaff yard-arm.	The tug-boat cannot go out at present.
23.	Blue ball above blue pendant at one end, and blue ball below blue pendant at the other end of flagstaff yard-arm.	Deliver to the steamer (bar-boat) your mails, correspondence, or any news you may be the bearer of.

All vessels, when approaching the bar, must hoist the signals of their draft of water at the fore top-mast, and stand in near enough to distinguish any signals made from the white tower, or from the pilot-boat on the bar; a large *red flag*, hoisted on the tower flagstaff, calls vessels to the bar—at the same time the signals of water then on the bar are hoisted on a *shorter* flagstaff; and when such signals denote a less draft than the approaching vessel, she should stand off again, and pay due attention to any alterations in the water-signals on the tower during the day. Unless the large *red flag* is kept flying on the tower, vessels are not permitted to enter, and whenever the signals are hauled down from the tower or pilot-boat, vessels should understand they cannot come in, but must stand out to sea, keeping a good look-out for the signals on the tower.

All vessels sailing in will be directed by the pilot-boats in the channel, which will wave a *red flag* either to the right or to the left, to point out the direction they must steer.

Vessels requiring a pilot, will hoist the draft of water over their ensign.

Vessels in distress, or requiring assistance, will hoist their ensign half-mast.

When the wind is light or unfavourable, and vessels can come in only by means of the tow-boat, a *white and red swallow-tail* pendant is hoisted on the tower under the water-signal, the pilot-boat at the same time hoisting the same pendant. Two powerful tow-boats, having a pilot on board, are stationed at the bar, under the exclusive direction of the government contractor. Vessels requiring the tow-boat, will hoist their ensign over their draft of water at the foretop-mast. The established rate for towage inside, from any distance not exceeding two miles from the bar, is 800 reis per ton (Brasilian); and for towage outside, the charge is 640 reis per ton; but if the vessel was not towed in, 800 reis per ton. The Brasilian measurement for tonnage is from 35 to 40 per cent. more than the British.

The SIGNALS for the *draught of water* on the Bar of Rio Grande do Sul, are denoted by the following Flags and Pendants, representing Brasilian palms, each of which is caculated to be equal to 8¾ English inches. They are as follows:—

		PALMS.	FT.	IN.
A white Pendant on the pole	signifies	7	5	1¼
A blue Pendant	„	8	5	10
A red Pendant	„	9	6	6¾
A white Flag	„	10	7	3½
A blue Flag	„	10½	7	8
A red Flag	„	11	8	0¼
White Flag above blue Flag	„	11½	8	4½
Blue Flag above white Flag	„	12	8	9
White Flag above red Flag	„	12½	9	1½
Red Flag above white Flag	„	13	9	6
Blue Flag above red Flag	„	13½	9	10
Red Flag above blue Flag	„	14	10	2½
Blue Pendant above white Flag	„	14½	10	7
White Flag above blue Pendant	„	15	10	11¼

		PALMS.	FT.	IN.
Blue Pendant above blue Flag	signifies ..	15½	(11	3½)
Blue Flag above blue Pendant	,, ..	16	(11	8)
Blue Pendant above red Flag	,, ..	16½	(12	0½)
Red Flag above blue Pendant	,, ..	17	(12	4¾)
Blue Pendant at top, white Flag in middle, blue Flag below	,, ..	17½	(12	9)
Blue Flag at top, white Flag in middle, blue Pendant below	,, ..	18	(13	1½)
Blue Pendant at top, white Flag in middle, red Flag below	,, ..	18½	(13	6)
Red Flag at top, white Flag in middle, blue Pendant below	,, ..	19	(13	10¼)
Blue Pendant at top, blue Flag in middle, red Flag below	,, ..	19½	(14	2½)
Red Flag at top, blue Flag in middle, blue Pendant below	,, ..	20	(14	7)

General Directions.—During north-easterly winds, a vessel should approach the bar of Rio Grande do Sul from that quarter, make due allowance for a strong southerly set, and go no further South than lat. 32° S. until her position is ascertained. As the soundings extend some distance from the coast the usual precautions should be taken with the lead, and in running to the southward close the coast a little northward of the lighthouse which is the most conspicuous object, and with the shipping inside the bar in all probability will be the first seen.

Do not haul too close inshore, but keep in more than 6½ fathoms water in order to clear the banks forming the bar, until the lighthouse bears about N.N.W., the outer edge of the south-east bank being steep-to; but no vessel can cross the bar under sail unless the wind is well to the eastward, so as to enable her to steer clean full about N.N.E. When the wind is from the south-westward the lighthouse should be made from the southward, and in coming from that quarter keep in not less than 6 or 7 fathoms water.

Unless the weather is unusually fine, the sea breaks now and then in 11 feet on the bar, and as it is frequently changing its position, a stranger should not attempt to cross it without a pilot, but in case of necessity or in vessels of light draught, the following directions should be attended to. Having sighted the lighthouse, hoist the signal of the vessel's draught of water, so as to be clearly seen, when on being repeated from the small staff on the watch-tower and the signal made to close, the red flag hoisted at the tall staff, steer towards the lighthouse for the opening between the breakers.

On approaching, the pilot boat at her station a short distance inside the bar will be observed, when steer directly toward her, observing her signal of the depth of water on the bar, which will be repeated by the watch-tower. Should the signal shown indicate a depth of water equal or more than the vessel's draught, she may confidently proceed on; but if the signal of the depth of water exhibited from the pilot-boat or watch-tower, or the red flag at the large staff on the latter be hauled down, the vessel should immediately stand seaward, off and on, or anchor for a more favourable opportunity.

On approaching the pilot-boat a red flag will be waved from her in the direction the vessel is to steer; when held upright, steer directly towards her. There is occasionally another pilot-boat stationed in the inlet between the bar and the anchorage West of the lighthouse, which also directs the course of the vessel with a moveable red flag. If the second boat should be in her station the vessel will be guided by its signals, immediately after passing the first pilot-boat; but, if it should not be there, she may act according to the signals of the first pilot-boat.

If neither of the pilot-boats are in their stations, and the red flag from the watch-tower, the signal to approach, continues to fly, the vessel should act wholly on the signals from the watch-tower, where, on extraordinary occasions, a red flag may be shown to guide vessels, as shown from the pilot-boats. When over the bar, steer to the northward between the black and white buoy on the starboard hand, and the black and red buoy on the port hand; and then keep all the black buoys on the port hand. When well inside the bar the water deepens rapidly, the channel widens, and the bank on either side shows distinctly; the course of the channel is about N.W. by N. trending to the northward as the vessel advances to the anchorage West of the lighthouse.

In proceeding up the channel keep along the western shore where it is steep-to, particularly abreast the sand-hills; when abreast Mangueira Point steer towards the sand-hills with a remarkable tall house amongst the trees a little on the starboard bow, and keep along the eastern shore, keeping the red buoy on the flats extending from the westward, on the port side, and anchor where convenient off Sao José.

The channel to the Rio Grande is narrow, circuitous, and carries from 9 to 20 feet, the former depth is in the bend of the channel; caution is requisite in taking it, for if a vessel grounds when the water is high, considerable delay and expense may ensue. A vessel should have a fair wind or a steam-tug. The Brasilian vessels are moored to the westward of the custom-house wharf, and foreign vessels to the eastward, and secured head and stern.

The Coast of Albardao, which may be assumed to extend from the bar of Rio Grande to the embouchure of the river Chuy, which is the boundary between Brasil and Uruguay, consists of a narrow strip of land forming a boundary between the sea and Lake Mirim with some smaller inland lakes. It is flat all along and from the bar of Rio Grande to Cape Castillos the water is shallow, having midway at about 17 miles from the shore only 10 fathoms, and in the latitude of the entrance to the Chuy at 34 miles from the shore the same depth will be found. Several vessels of 10 feet draught have navigated close along this shore. Vessels of large draught should not, however, approach it too close, as Captain Mouchez says that the depth is very irregular, with patches of less than 5 fathoms.*

This irregularity of the bottom seems to extend to the offing, as several shoals have been lately announced. One of them was seen, it is said, in the *Princeza de Joinville*, in 1866, at 52 miles S.E. ¼ S. from the lighthouse at the entrance of the Rio Grande. Two other shoals were seen by H.M.S. *Curlew* in 1865, one of 6¾ fathoms at 12 miles off shore, and 67 miles from the the mouth of the Rio Grande; the other 76 miles from the same point, and 26 miles off shore. It has 10 fathoms water, surrounded by depths of 25 to 30 fathoms. Beyond this is another shoal of 8 fathoms, 33 miles off shore.

The first remarkable object southward of the entrance to the River Chuy, is a rocky point. with a few isolated and partly submerged rocks off it, named *Chicos*, or *Castillos Pequenos*, or the Small Castles; it forms the northern extremity of Castillos Bay, the flat sandy shore of which curves to the southward, and at the distance of about 27 miles is Cape Castillos. At about 8 miles northward of the cape are two hills (*Los dos Hermanos*) in an East and West direction.

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* CAUTION.—The coast of Albardao, which comprises more than 120 miles, frequented by ill-disposed men, in the greatest part wanderers, and intimately connected with the natives of the Oriental State who inhabit the neighbourhood of the Chuy as far as Castillos, and are known by the name of "Montoneros." These men commonly flock to the shores of the sea whenever they nourish hopes of plunder, and thus is explained the general cognizance of the fact without the possibility of coming to the knowledge of who are its authors. This simple description of the place is sufficient to show the great difficulties attending the discovery of the depredators of goods saved.—*Report of the Chief of Police, 10th of May*, 1862.

But the few inhabitants strewed over this vast desert, in order not to be discovered and punished, used to convey into the interior everything which they could pilfer.—*Official Report, 3rd July*, 1861.

VIII.—THE RIO DE LA PLATA.

The RIO DE LA PLATA is one of the largest known rivers in South America, after the Amazon. It was discovered by Juan Diaz de Solis, in 1515; who navigated it as far as a small island in lat. 34° 23′ S., and who, having seen on the shores some cabins, had the boldness to disembark with ten men; when they were all put to death by the aborigines. Five years afterwards Sebastian Cabot, who, from neglect, passed from the service of the English to that of the Spaniards, was sent to discover the Strait of Magellan. But finding himself impeded in his views by the disobedience of his crews, was under the necessity of entering the River Plata, which he navigated as far as the island discovered by Solis, and to which he gave the name of San Gabriel. He pursued his voyage as far as the rivers Paranà and Paraguay, had a battle with the Indians, in which he lost twenty-five men, but succeeded in routing them, taking from them treasures of silver, which they had brought from Peru; and, supposing that there was an abundance of this metal in the territories washed by the river, called it Rio de la Plata (river of silver); whereby it lost the name of Solis first given it by the discoverer.

The Rio Plata is at its mouth about 110 miles wide from Cape St. Antonio on the South to Maldonado on the North. From thence, to the junction of the Uruguay, it preserves its name, being afterwards called the Paranà Although the whole of it is navigable, it has many shoals and rocks. Between Point Piedras on the South, and Point Yeguas on the North, it is 46 miles wide. The coloured water which it brings down is often visible in the Atlantic about 100 miles from its embouchure. The estuary of the Plata is generally shallow, and the navigation extends along the southern shores. The tides are perceptible as far as Buenos Ayres, but between Point Las Piedras and Point Yeguas the water is generally fresh.

The PARANA rises in the province of Minas Geraes to the South of the city of San Joaz del Rey, in some lofty sierras, in Brasil, and flows a course for the estimated distance of more than 1000 miles, receiving innumerable tributaries, many of them navigable from the North, West, East, and South. At about 300 miles from its mouth two falls impede its navigation. The country through which it flows is temperate and very fertile.

This river and most of its confluents bring down from the countries within the tropics to the higher latitudes a great volume of water, which inundates the low districts along its banks from February to May. The waters rise in the end of December, and increase gradually to the end of April. They descend to their lowest point in July. Along the lower part of the river the inundation rises about 12 feet above the lowest water level, and leaves a slimy deposit which enriches the soil.

The water continues fresh as far down as the river Santa Lucia, 12 miles above Monte Video, on the North, and Piedras Point on the South, when it becomes brackish. It is long in mingling with that of the sea, which loses its blue tint at a distance of 75 miles from the mouth of the river. Vessels of large draught may navigate as far as Monte Video, and those of 17 feet draught to Buenos Ayres and the islets of Hornos, north-west of Colonia. Small vessels enter the inner road of Buenos Ayres to within about half a mile of the town.

In approaching on the parallel of 33° 45′ S., at 10 miles off shore may be seen in the West the *Sierra del Carbonero*, a range of hills 4½ miles long in a N.E. and S.W. direction, the centre being the highest; it lies inland 9½ miles from the shore, and is on the frontier line between Brasil and the Banda Oriental or Uruguay. On one of the slopes of the hills the fort of San Miguel is very conspicuous.

After running 25 miles parallel to the coast the *Cerro de los Difuntos* will be seen; it is composed of several summits of about the same height, and is situated 6 miles from the shore one the West side of a lagoon. Seen in the N.W. this cerro presents a gap or ravine, having a great resemblance to Rolands gap in the Pyrenees, which is a marked feature.

As you advance to the south-west at the same distance from the cast, the naked conical hill of the *Cerro* or *Agudo de Navarro,* rising from the centre of a group of smaller hills, will show itself. It lies 5 miles W. by S. ½ S. from the Cerro de los Difuntos, and at 9 miles from the shore. Rolands gap is well seen from this position bearing N.W.

CAPE CASTILLOS is the most northerly point that a ship should sight, if from the state of the weather or the position of the vessel it should be thought prudent to make the land before running up to Lobos islet. This cape is easily distinguished by the white rounded sand-hill at its back and the black islets which lie off it. At the end of the white sandy downs which form the southern limit of the coast of Brasil is a rocky point which trends slightly to the North, after which the shore stretches for a mile to the south-east, and forms another rocky point; the former is *Cape Castillos,* the latter point *Coronilla.*

The *Cerro de Buena Vista,* a round sand-hill, rises to a height of 184 feet above the sea, midway between the above two points, close to the shore. Its isolation and peculiar form render it a good mark for this part of the coast.

The high mountain range, *Cerro Chafalote,* is 19 miles westward of the cape. It is easily recognised by its isolation in the midst of the plain, by its greater size, and by its outline, which, seen from the eastward, presents three summits, of which the centre is the highest. This group of remarkable landmarks renders Cape Castillos a preferable landfall to Cape Santa Maria.

Castillo Grande, or *Marcos,* an islet at about 1½ mile to the eastward, derives its name from a steep black rock like a castle, which stands up on its south-eastern side 105 feet above the sea. From a few miles in the offing this rock looks like a vessel under sail, or if seen against the coast it is well defined on the white sand-hill of Buena Vista behind it. The islet is nearly circular, and about 320 yards in diameter.

Castillo Chico, or *Isla de Tierra,* is a smaller islet lying to the westward of the former; it is not so steep, and is separated from the coast by a passage 160 yards wide and 20 feet deep. The islet is about 40 feet high, and its top covered with bushes. In the channel between the two Castillo islets there is a depth of from 8 to 9 fathoms, sand and mud. Vessels of any size may pass through without difficulty.

From Cape Castillos the coast to the north-west forms a small sandy bay, where boats may land.

In this *Ensenada,* or *Bay of Castillo,* vessels of any size may find shelter from all winds from S.E. round by the South to N.W. The best anchorage is with the summit of Buena Vista, bearing about S.S.W. ½ W., at 3 or 4 cables from the point, in a depth of 4 fathoms, fine sand; but patches of rock are scattered about. These anchorages, which were formerly much frequented, are now completely forgotten. It is useful, however, to recall their existence to the mariner.

Cape Polonio, 2¾ miles to the southward of Coronilla Point, is a steep rocky promontory, forming three points; that to the south-east being named Polonio; above it is a greenish cone-shape hill, rising about 120 feet above the sea. The *Islas de Torres* are a group of three islets which extend 1 mile to the eastward of Cape Polonio; they are arid rocks, from 12 to 18 feet high. The two inner are named *Raza* and *Encantada,* and are surrounded by a reef; the third, named Islote, lies 1½ mile E.N.E. from the cape, and at a cable to the N.E. of it is a detached rock, generally above water. A dangerous reef, barely awash, named the *Bisson,* lies at 2½ cables to the West of Islote.

The *Polonio Reef* is a dangerous rocky shoal, lying 2¾ miles S.S.W. from the cape, and takes its name from a Spanish vessel that was lost on it in the year 1735. The reef extends 7 cables in an E.S.E. and W.N.W. direction, and the least water over it is 11 feet, while close alongside it there are 11 fathoms. The shoalest spot is one-third its length from its western end, and the sea almost breaks on it. *Polonio Bay* lies to the south-west of the cape, and offers for anchorage with off-shore winds, and as far out as N.E.

Punta Rubia (Red Point).—The coast from Cape Polonio extends in a low range of sandy downs, south-west for 20 miles, to a red cliff, named Rubia, which is remarkable as the only cliff of that colour in the whole extent of the embouchure of the La Plata, whence it takes its name. It might be taken for an island near the coast, whence it was named Isla Falsa. The natives likewise know it by the name of *Punta del Rodeo.* With the exception of the Polonio Reef, the coast is all along clear of danger.

The *Loma de Narvaez*, a range of hills lying 6 miles in-shore from Punta Rubia, stretches from N.E. to S.W. about 4 miles. On the centre hill, which is the highest, is the estancia or farm-house Don Carlos, remarkable by a solitary high ombu tree which crowns the summit. The *Silla Chica* is a small blackish saddle hill, at 13 miles inland; it is remarkable from the offing. The *Silla Grande*, a similarly shaped hill, lying 5 miles about W. by N. of the former, is rather more elevated.

CAPE SANTA MARIA, improperly named a cape, as it is only a low point, lies 4 miles southward of Punta Rubia, the coast between forming a small bay, in which is the anchorage of Arecife, well sheltered against westerly and south-west winds. A reef of rocks extends a cable's length to the southward of the cape. A short distance to the northward are the two small islands of *Paloma* and *Tuna*, or *Espinosa*, which together form the small harbour of Paloma, a circular basin of 4 cables in diameter, having a depth of from 8 to 9 feet over a bottom of fine sand. About a dozen coasters could find room here. There is a small stream of fresh water at its northern end.

There is anchorage West of the cape, with off-shore winds, in 6 or 7 fathoms water, about three-quarters of a mile from the beach. Cape Santa Maria is called by the natives *Punta de Rocha*, on account of the town and lagoon of that name a few miles inland to the north-west. The northern islet of the two which lie off the cape is the larger, and is named Paloma; it is about a quarter of a mile in diameter, its southern part 26 feet high, and it is green. A reef extends off it 4 cables to the N.E. The other islet, Tuna or Espinosa (so called from the cactus which grows on its summit), is low, sandy, and covered with brushwood.

Arecife Anchorage, as already mentioned, is in the small bay to the North of Paloma Isle. At 1¼ mile N.E. by N. from the islet there is a rocky head, having only 16 feet water over it, which must be avoided by a vessel going into the bay to seek shelter. The bearings for the 16-feet rock are, the centre of Paloma S. by W. ¼ W., the white sandy down near the sea on with the gap in the hill W. by S. ¼ S., and Rubia Point N. ¼ E. The distance of the rock from the shore is 1 mile.

In approaching this part of the coast from the offing, the mariner must be on his guard not to make a mistake between Cape Santa Maria and Cape Castillo, which has been frequently done. If the weather be fine, the difference of 17 miles in lat. should be a sufficient guide; but if cloudy, he should remember that cape or rather point Santa Maria is low, and backed by sandy downs of moderate height, indented by three gaps as seen from the N.E., the north-easternmost gap being twice as large as either of the others.

Cape Castillos, on the contrary, may be recognized at a distance by the round white sand-hill of Buena Vista (184 feet), and, rising up in advance of it, the steep black islet Castillo Grande (105 feet), with the detached green hill (120 feet) of Cape Polonio about 3 miles to the southward. Seen from the N.E. the coast about Cape Castillos presents the aspect of separate conical hills, while near Cape Santa Maria the appearance is of undulating sand-hills, varying from 50 to 80 feet in height. In heavy weather, if the land cannot be made out, come no nearer than 15 fathoms water, as there are 12 fathoms close to Polonio Reef.

The Coast from Cape Santa Maria extends W. ½ N., a uniform sandy beach for 5 mile to the Laguna de Rocha, and then S.W. by W. for 21 miles to San José Ignacio or Piedras Point.

Punta Piedras, or *San José Ignacio Point*, so named on account of the lagoon of this name in the vicinity, is remarkable from a hill which rises above it, and on which may be seen, from a distance, a large white triangular patch of sand bordered by verdure. The point is formed by a frontage of rocks two-thirds of a mile in extent East and West, divided by a small sandy beach. At 1 mile South of the cape there is a plateau of rocks on which is a depth of 5½ to 8 fathoms.

PUNTA del ESTE, or East Point, which should be considered the real point of entrance of the La Plata, forms the eastern part of Maldonado Bay, It is a small blackish headland at the end of some sandy downs, and rises about 50 feet above the level of the sea, with a lighthouse on its summit. Some rocks extend more than a mile to the W.S.W. In coming from the offing, if the weather is fine, the summits of the mountains Pan de Azucar and the sierra de las Animas may be seèn in the N.W. 8 or 10 miles before seeing Punta del Este.

LIGHT.—On the highest part of Punta del Este (East Point), at a quarter of a mile from its extremity, is a tower 90 feet high, which exhibits, at 152 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 20 miles.

LOBOS ISLE, 4 miles to the south-east of East Point, is flat, rugged, 65 feet above the sea, and may may be seen from a distance of 12 to 15 miles. It is usually visible a little sooner than East Point; its coast is rocky, and can only be approached by a sandy creek on the North side of the isle, near the place where are the huts of the seal hunters.* The West side of Lobos is steep-to, but on the East side is a detached, partly uncovered reef, which extends E. ¼ S. nearly a mile from the shore.

Between Lobos and the main there is a channel 4 miles wide, with a depth of 10 to 15 fathoms, mud, with sand and mud. This channel, however, had better be avoided in light winds with a swell, as the currents are stronger than in the offing.

The *Morro San Ignacio* is a lofty and remarkable summit, which rises over a series of undulating hills, named *Asperezas de Maldonado;* it lies 19 miles N. by W. of San José Ignacio, or Piedras Point. *Los Tres Cerros* lie 8 miles more to the W.S.W. It is a hill with three summits. The *Cerro de Carape*, at 19 miles northward of East Point, is of moderate height and has a rounded top.

MALDONADO BAY, 5 miles wide by nèarly 2 miles deep, is formed by East Point and that of Ballena. It is exposed to S.W. winds, which cause much sea, but a portion of the bay is sheltered by the small island of Gorriti and by the patch of the Monarch Rock. On the beach North of Gorriti is a wooden pier, and inside East Point is a small sandy cove; the latter is the only place at which supplies can be shipped when the surf is on the beach after S.W. winds.

The shores of the bay are clean, with the exception of *Arecife* or *Granite Point*, 2 miles westward of the pier, which is rocky. The small town of *Maldonado*, which gives its name to the bay, stands on the brow of a hill about 200 feet high, three-quarters of a mile from the beach, with a population of about 1,500 inhabitants. It is conspicuous by a square tower about 120 feet high, painted white, with a red base. San Carlos, a town of about the same size, is 7 miles further inland. Between this town and the wooden mole is the cemetery, known by its dome.

Gorriti Island, which gives shelter to the anchorage, is nearly a mile in length North and South, and about 3 cables average breadth. It is low, of sand and rock, and has a small bay and beach on its West side. Some small batteries, and a storehouse for the produce of the seal fishery, existed here in the beginning of the century, but are now in ruins. A rocky ledge extends a cable off its north-west end, steep-to, with 6 fathoms water alongside them, and a sandy spit 4 cables off its north-east end, which must be carefully avoided.

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* The seal-fishery is farmed out by the government. It is said that the lighthouse was removed from Lobos Island to East Point because it disturbed the seals!

At nearly half a mile W. by S. from East Point is the outer edge of a reef of rocks, about 3 cables in diameter, with only 1 fathom water over it, and on which the sea always breaks. The *New* or *Parker Rock* is a shoal about a cable in diameter, with 4½ fathoms water on it. It lies W. by S. ½ S. distant 1 mile from the lighthouse on East Point, and S. ½ E. 7 cables from the South point of Gorriti Island, with Maldonado tower over the first rock on the West side of a sandy cove at the South end of Gorriti; and the wooden hut on East Point once and a half the breadth of the salt mill open southward of it.

The *Monarch* is a rocky patch with 4 fathoms water on it, but probably less, which would bring up a vessel of large draught. This shoal lies half a mile W.N.W. of the north-west point of Gorriti, leaving between a channel 3 cables in breadth with 7 fathoms water. The leading mark through is the dome of the cemetery over the pier, bearing N. by E. The Maldonado tower over the pier N.E. by E. leads 2 cables westward of it.

There are no tides in Maldonado Bay; strong southerly and south-east winds raise the water 6 feet, and the opposite winds drepress it.

Vessels of any size may anchor in safety in 5½ fathoms water, sand over stiff mud, with the north-west end of Gorriti Island from S. by W. to S.W. ½ S., and Ballena Point about W. by N. Small vessels may anchor with the north-west point of Gorriti S.W. ½ S., the north-east end S.S.E. to South, and the pier N. by W. to N.N.W., clay and stiff muddy bottom, with layers of sand. In all cases when necessary to moor, it should be with open hawse to the S.W.

A pilot resides at East Point, and is a general pilot to Buenos Ayres, &c. Pilot cutters are also frequently off this bay, having both Buenos Ayres, Ayrean, and Monte Videan pilots on board; they are mostly English, Americans, or Italians.

Water may be obtained from a small running stream, about 150 yards eastward of the pier. From between the banks it is excellent, by sinking a tub to put the hose in. Fresh beef and vegetables may be had at very moderate prices. Live stock is reasonable, and cheaper than at Monte Video.

A vessel bound into Maldonado Bay may pass either side of Lobos Isle, avoiding the reef extending from its East side. East Point will be known by the lighthouse, and by a large dark wooden framework at its extremity. If southward of Lobos Isle, the town and tower of Maldonado will be seen, and probably the Pan de Azucar, and the Sierra de las Animas north-west of it. Having passed the isle, East Point should not be brought to bear eastward of E.N.E., and when Maldonado tower is open of the south-west side of Gorriti Island, bearing N. ½ E., haul up for either channel, keeping the Pan de Azucar open of Ballena Point.

Ballena Point, at the West extreme of the bay, is bold, and may be passed at a prudent distance. In working into the bay from the westward, a vessel may stand into 6 fathoms water, at the distance of a long half mile from the shore; and in approaching the Monarch, keep the Pan de Azucar northward of the saddle on Ballena Point.

Potrero Bay, West of Ballena Point, and between it and Level Point, is 7½ miles in extent. The bay is clear, and affords anchorage with off-shore winds.

Punta Negra, or *Black Point,* which presents an East and West headland or frontage 2½ miles in extent, is formed by three rocky points, separated by two small sandy bays. The eastern point is named *Raza* (Level). the centre *Negra* (Black), and the western *Iman* (Magnet). They are all steep, and are overlooked by the high grounds which are connected with the Pan de Azucar. After having rounded Iman Point the shore trends to the N.N.W., and at 3 miles is the rocky *Punta de Burros* (Donkeys); the small bay which lies between is called *Puerto Inglees.* At 5 miles beyond is the *Punta de la Sierra;* it is low, and a reef of rocks extends 2 miles off it.

Pan de Azucar.—To the N. by W. of Punta Negra, or Black Point, is a mass of mountains, of which the culminating points, the *Pan de Azucar* and the *Sierra de las Animas*, are the highest summits of all this coast. They may be seen in fine weather at a distance of about 40 miles, and are consequently of great utility when a vessel makes the land in the parallel of, or to the south-east of Lobos Islet. The Pan de Azucar, as its name indicates, is a nearly regular cone, and rises 1,375 feet above the sea at only 3 miles from the beach; it is of granite, and a black, arid mountain, isolated.

The Sierra de las Animas lies 5 miles to the N.W. by N. of the Pan de Azucar, and rises still higher (1,765 feet), but its summit is flattened, and has a slight depression in the form of a saddle, which is visible when seen bearing W.N.W.

The PUNTA de AFILAR lies 7 miles westward of Punta de la Sierra, with a clean sandy beach between. This point takes its name from some conical hills close at hand, called Piedras de Afilar (whet-stones), in which are quarries of this sort of stone.

Afilar Bank, or *Isla Chica*, is a reef of stones nearly awash; it lies 1¼ mile South of the Punta de Afilar. It is surrounded by breakers, and covered at high tides. The *Solis Bank*, 3 miles eastward, lies 3 miles off shore; it is rocky, 4 cables long East and West, and 2 cables North and South. It is awash, covered at high tides, and the sea breaks on it constantly.

Punta de Piedras Negras, the next salient point, is double, and lies about W. ¼ S. 10 miles from that of Afilar. A rocky shoal, less than that of Afilar, lies S.E. at a short distance from Piedras Negras.

La PLAYA de SANTA ROSA, an extensive gravel beach, ranges for 19 miles beyond to the W.S.W., as far as *Punta Buceo* or *Carretas Point*, which has a reef stretching half a mile off. It is rather sinuous, but clean and steep-to. The sea is very heavy along this coast in all winds between South ond East, and the strong currents would drive a ship bodily ashore. Several vessels have been lost here, and their crews have perished, not from rocks, but from the heavy surf that breaks on this steep shore.

The *Buceo Bank* lies N.E. by E. ¼ E. 6 miles distant from Buceo Point, and N.N.W. ⅛ W. 5 miles from Flores lighthouse. It is 1¼ mile in extent. *Carretas* or *Pipas Bank* is a small rocky shoal extending half a mile E.S.E.; it is covered at high water, and lies 2¼ miles from Buceo Point. At two-thirds of a mile E.N.E. ¼ E. from this latter point is the reef of La Luz, named after a Spanish vessel lost here in 1752, which drove her during a storm from the roadstead of Monte Video, and she became a total wreck.

A rock, named *Dognel*, is said to exist at 6 miles East of Buceo Point, but it is far from certain that it may not be Buceo Bank, which lies at the same distance from the point, but 2 miles more to the N.N.W. All this space between Point Buceo and Flores, although 7 miles wide, appears to be doubtful ground, and should be avoided. The currents are also stronger in this channel than South of Flores.

FLORES ISLE, at 7¼ miles E.S.E. of Buceo Point, is a good landfall, and one always made; it lies 56 miles about W. ¼ S. from Lobos. The islet is 7 cables long N.E. and S.W., and 2 cables wide. It is low, but has a slight eminence in the middle and at each end. The coast is steep-to, except to the N.E., where a reef projects half a mile: there is anchorage all round the islet, but the best is to the W.N.W. at half a mile off shore, in 5 fathoms water, mud.

At about three-quarters of a mile S.W. by W. of the islet is an apparently isolated rock, having only 17 feet over it, on which H.M.S. *Cumberland* struck on the 15th March, 1858. There is 5 fathoms water between the rock and the shore. This danger should be carefully avoided.

At 4 miles to the westward of Flores, and at the same distance from Buceo point, the charts show a shoal, named the *Néréide* or Buen Viage, of which we have no particulars. The transport *Nautilus* is said to have struck upon a 14-feet rock, but from the bearings it was probably on the Carretas bank. The *Sara*, of London, too, is said to have grounded upon a shoal, the position of which is doubtful.

LIGHT.—On the most elevated point of Flores Islet to the south-west, which rises 50 feet above the sea, is a white lighthouse, which shows a *revolving* white light once in *three minutes*, at a height of 104 feet above the mean sea level, and should be seen 12 miles in clear weather. This light was first exhibited in the year 1833. The mariner is warned that it is not to be depended upon.

BASSURAS BAY, formed between Buceo and Bravo points, is 6 miles in extent and 1½ mile deep; it includes five small bays, separated by as many points of rock. A short distance off shore in this bay it appears that some rocks exist whose position is unknown; the mariner, therefore, should be on his guard.

The PUNTA BRAVA de Carretas is so named, doubtless, from its form and from the dangers that surround it. It is low, and terminated by a reef extending half a mile to the southward; at its extremity is a detached rock awash. Ships should round Point Brava at one mile off at least, and more by night or in foggy weather: it is the most salient point towards the South, and lies W. ½ S. of Flores.

Punta Brava, W. by N. by compass, 12 *miles, and Monte Video Lighthouse appearing over it.*

The Punta de la Caleta is 2¾ miles N.W. ½ W. of Punta Brava, and forms the S.S.W. extremity of the peninsula of Monte Video. The coast between is rocky, and forms a bay three-quarters of a mile deep; in the middle of this bay is a small sandy cove, named Caleta Chica, or Pocillos. The West point, named *Perez*, is the only one which has any small reefs off it. Passing *Gabriel*, *Teresa*, and *Sarandi* points, the *Hydra*, *Griffon*, and another 10-feet rock between them, lie at 1½ cable from the shore, and should be given a good berth as the vessel passes up to the inner anchorage in Monte Video Bay. The Griffon rock, off Point San José, and the Hydra rock southward of it, are marked by beacons.

MONTE VIDEO BAY is in form almost circular, its diameter being 1½ mile, and having an opening over one-quarter of the compass towards the south-west. It is comprised between San José point on the East and Punta del Rodeo on the West, at 1½ mile apart, and sheltered from all winds from West round northerly to S.E. The eastern shore of the bay is a beach of fine sand, with a few rocky points; the western, at the foot of the Cerro, is entirely rocky. The bottom all over is of very soft mud, with three or four patches of rock. The depth varies from 15 to 10 feet; the bay, therefore, can only admit vessels of comparatively small draught of water. The harbour, strictly so called, is a small space of less than half a mile square, close off the north-west face of the town, with a depth of 19 to 14 feet, mud.

There are some islets and patches of rock within the bay. *Ratones Islet*, to the north-west, was formerly fortified, but now is used only as a store-house, and occasionally as a lazaretto: it is surrounded by rocks. At 4 cables to the south-eastward of Ratones is a reef awash, at very low water, named *Piedra de Sarina*, which is marked by a beacon; another smaller patch lies 3 cables to the North of Ratones, and on the East side of the bay, at half a mile North of the mole, is a group of rocks named *Piedras de Familia.* On the North beach, near the Punta de Piedras, is the spot on which H.M.S. *Gorgon* was stranded, when driven from her anchors in a pampero on the 10th May, 1844.

El CERRO, or the MOUNT, is the distinguishing feature of the port. It rises on the western side of the bay in the form of a regular, isolated, bare cone, to a height of 465 feet, at less than three-quarters of a mile from the beach. It is crowned by a fort, on which there is a lighthouse, showing a flashing light every three minutes. The Cerro is useful to the mariner on all accasions, as a conspicuous and easily recognized landmark.

SAN FELIPE de MONTE VIDEO, the capital of Uruguay, stands on a gently rising ground on the East side of the bay, at its entrance, occupying a small peninsula, extending East and West 1¼ mile by half a mile average breadth. The principal building is the cathedral, an imposing structure, with its dome and two towers, which may be seen a long way in the offing. The houses are mostly of one floor, and flat-roofed: the streets cross each other at right angles. and are paved. The customhouse is on the North face of the town, near which some small moles or piers project into the bay.

Consuls of all nations reside here, and there is an English church on the South side of the town near the shore. The population of the city and the immediate neighbourhood in 1862 was about 60,000. Labour and materials for any kind of repairs are extravagantly dear.

Water and other supplies may be got easily at Monte Video. In 1859, fresh beef was 2d. and vegetables 1⅜d. per pound. Several small streams run down the slope of the Cerro; the most convenient is that half-way between South-east point and the Punta del Cerro. Water is also brought off from the town at about 1½ dollar per ton. In 1862 coal was £2 10s. per ton.

LIGHTS.—A *fixed* and *flashing* light, showing a flash every *three minutes,* is exhibited from a light-tower within the fort on the summit of the Cerro, at an elevation of 486 feet above the sea, and should be visible in clear weather, *when kept properly trimmed,* at a distance of from 20 to 25 miles. A white light is also shown at 147 ft. above the sea, by the dial-plate of the clock in the south-east tower of the cathedral, having been lighted by gas, visible from 6 to 10 miles, which enables vessels to anchor in the outer road at night, by cross bearings of the two lights.

The ANCHORAGE for large vessels in the road at Monte Video is about 2 miles southward of San José point, in 22 feet water, mud, with the Cerro bearing about N.W. ½ N., and the cathedral N.E. or N.E. by N. Vessels may anchor further in as convenient, and those of light draught in the inner anchorage, in from 9 to 14 feet water, mud.

Captain Sir Thomas S. Pasley says:—"Vessels who can depend on their anchors and cables may anchor safely in the road of Monte Video in the same depth of water as they draw, provided the river is at a mean height, for, whenever the wind sets in from the southward, the water rises sufficiently, and the bottom being so very soft, 3 feet more than the vessel's draught is amply sufficient to ride out the heaviest gale without injury." The sailor will of course keep clear of his anchor.

TIDES.—There are no regular tides at Monte Video; in fine weather there may be a set of a quarter to 1¼ miles an hour, but its direction is uncertain, and the water rises and falls occasionally as much as 4, 6, or even it is said 8 feet, but this is entirely due to the wind, the water rising with East, S.E., and S.W. winds, and falling with those from the opposite quarters. The water forced into the bay by the first part of a strong S.W. wind is headed up, and rushes out, long before the wind has ceased to blow, as a counter current round the point San José, causing vessels to ride across the wind, to roll frightfully, and frequently to part their cables and go on shore. The bottom, however, is so soft that they get off again without damage to the hull.

If vessels moor it should be with open hawse to the S.W., being the quarter from which the pampero blows strongest.

LOBOS POINT, the South extreme of the Cerro or mount, and of the bay on the West, has some rocks off it to the distance of half a mile, by the name of *Piedras Blancas*, or White rocks, with 20 feet water close to; the coast thence trends to the West, forming three rocky points, the westernmost of which, named *Yeguas*, is low, in the form of an islet, and joined to the main by a tongue of sand, with a reef on the East side, but steep-to on the South.

Espinilla Point is the southern limit of the embouchure of the River Santa Lucia. Its extreme point is low and rocky, and extends half a mile to the south-west, where is a depth of only 7 feet, fine sand. There are some remarkable white patches on the rise of the point.

The PANELA, a dangerous reef which, it is said, never breaks, lies about S. ⅛ W. from Espinilla Point, distant 4¾ miles; and W.S.W. ⅛ W. from the cerro of Monte Video. This reef, as reported by Captain Barnard of H.M.S. *Vixen*, which struck on in 1853, extends some distance E.S.E. and W.N.W., probably 400 yards. It has several rocky heads upon it, with 7, 10, and 13 feet water on them. M. le Capitaine Barral, who sounded over it in 1829, says 3 feet. Captain Barnard, R.N., in a boat from the depth of 9 feet, made the dome of the cathedral bear E. by N., Cerro lighthouse E.N.E., and the westernmost white patch, on Espinilla Point, which is remarkable, N. ⅛ W.

A lightvessel was first moored March 16, 1866, at about a cable's length N.N.W. ⅛ W. of the reef. She shows a fixed white light, elevated 17 or 18 feet above the sea, and seen 5 or 6 miles off.

The lead gives no warning of this danger; all around there is a depth of 4 fathoms, mud. A vessel in the vicinity of the reef by day in clear weather, and the lightvessel not in place, should keep the Cerro lighthouse clear of an E.N.E. bearing until the westernmost white patch on Espinilla Point bears eastward of N. by E. ⅛ E. To pass between the Panela and the Santa Lucia bank, keep the cathedral entirely masked, or the Cerro lighthouse to bear a little eastward of E. by N.

SANTA LUCIA RIVER has its outlet between Espinilla Point to the South and Tigre Point to the North. *Santa Lucia Bank* is a sandy flat thrown out by the river. It is ill-defined, but its south-western 3-fathoms spit appears to extend 7 miles from the shore, and the same distance from Espinilla Point.

The Coast to the westward of the river Santa Lucia is a sandy cliff or Barranca, from 70 to 100 feet in height, extending 22 miles in a W. by N. direction, as far as *Santa Maria* or *San Gregorio*, a dark bluff point. From Santa Maria Point, which is 100 feet high, the coast to the westward is much lower, and composed of sandy downs from 20 to 30 feet high for 4 miles, as far as Sandy Point, which is low.

Between these two last-named points a small curved sandy spit, having 9 and 12 feet over it, extends 3 miles off shore; and at 8 miles to the eastward, opposite the outlet of the Rio San Gregorio, is said to be another shoal spot of 12 feet. Vessels often complete water from alongside in this vicinity; it is generally as good as that obtained farther up. Fish may be obtained by hauling the seine in the bay between Santa Maria and Sandy points. To the north-westward of Sandy Point, a sandy beach continues, with downs at the back from 30 to 90 feet high, as far as the outlet of the rivers *Pereyra* and *Pavon*.

This spot is the limit of the 3-fathoms navigation in this quarter. The spit of the Great Ortiz bank here leaves the shore in a S.S.E. direction, and forms a *cul de sac*, named the Ensenada de Pavon, where is a rather exposed anchorage for vessels in 3¼ fathoms, mud. There is an inshore channel between the great mass of the Ortiz bank and the land, for coasters, gunboats, and all vessels that do not draw more than 12 feet water, for 37 miles to Colonia. At the *River Cufré*, 6 miles beyond the Pereyra, the coast changes from a north-west to a general West direction, and so continues to Colonia.

From the Rio Cufré westward there are three points. The first point, *Rosario*, is low, and not easily distinguished. *Sauce Point* is easily made out, as it is the most wooded on this part of the coast. *Artilleria Point*, at 5 miles West of Sauce Point, forms with it a rather deep bay. It is bordered by rocks, which extend 4 cables to the southward.

Las Pipas Rocks, 6½ miles W. by S. of Artilleria Point, and 2 feet above water, lie 1¾ mile off shore. These rocks take their names from their appearance of barrels floating on the water. At 1½ mile N.E. of Las Pipas is another reef, one mile from the shore.

La COLONIA del SACRAMENTO is built on a slightly elevated peninsula point, to the westward of which extend some islets and reefs, which shelter the roadstead. The north-west point of the peninsula is named San Rita, and the south-west point San Pedro. Vessels drawing 18 feet can find good anchorage, but the reefs which shelter the road from the West and South make the entrance difficult, and render it necessary to take a local pilot. Vessels may anchor at 5 cables from San Rita Point, bringing the light to bear about S.E. by E., where there is anchorage in from 4½ to 5 fathoms water, mud.

If necessary to moor, it must be with open hawse to the S.S.W. At this anchorage vessels are sheltered from winds from the North, round by East to S.E., but the only protection against S.W. winds are the off-lying islet of San Gabriel and the Laja Bank.

The Hornos Islands afford excellent shelter from S.W. winds round by South to E.S.E. The strongest winds are from the westward, but then there is less sea, and they are not felt so much as those from S.E. to E.S.E. There is good anchorage on the North side of Gabriel Islet, but vessels of large draught should moor. Coasting vessels in this vicinity when overtaken by bad weather seek shelter here.

Light.—The light at Colonia is established at the south-west angle of the plaza. It is a white *revolving* light, attaining its greatest brilliancy every *three minutes*, at a height of 110 feet, and said to be visible at 10 miles distance in clear weather.

Islets off Colonia.—*San Gabriel Islet*, 1½ mile to the West of Colonia, is low, slightly wooded, and half a mile long by 2½ cables broad. At a quarter of a mile to the eastward of the *Laja*, a rocky bank, which breaks in a strong breeze. The *Farallon* is a rocky islet 12 feet high, which lies S.W. by W. of San Gabriel; it is surrounded by a reef.

Lopez Islets lie East and West about 2 miles north-west of Colonia; they are bare rocks, 8 and 10 feet high, each in the midst of a long sandy flat or spit, which extends to the N.W. beyond the Hornos Islands. At 2½ cables North of the islet H.M.S. *Comus*, in 1847, was hove down to repair damages, as being the most sheltered spot on this part of the coast.

There are three or four small shoals shown on the chart, but the outer is the *Beaumanoir Reef*, at 2 miles W. by N. of San Gabriel, which has one spot with 12 feet on it. It bears from Lopez West Islet N.E. by E. ¼ E.

Fisher's Bank, the spit of the Outez bank, called the Fishers or N.W. Pescadores, has some 10 and 12 feet patches on it, and forms the shelter to Colonia road on the South. The great Ortiz bank or flat of muddy sand is an important submarine feature, and stretches three parts across the La Plata; it extends from Colonia to the eastward along the North shore for about 37 miles, while its eastern 3-fathoms edge trends to the S.S.E. 35 miles out into the river, forming a bank or flat of more than 600 square miles, the depth over it, as far as it has been sounded, being from 9 to 12 and 15 feet.

Along shore at its northern edge is its deepest part, and coasters and small steamers can carry 12 feet through this inshore channel to and from the roadstead at Colonia.

A vessel with a fair wind, or a steamer, bound to Colonia road from whatever quarter, except along the inshore channel from the westward, should pass to the southward of the Farallon, giving it a berth of 1¼ mile until the centre of San Gabriel Islet bears N. by W. Steer on that course until within 1½ cable of the shore of the islet; then alter course, sharp, to E. by N. for 1¼ mile, or until Colonia lighthouse bears N.E.; when again alter course sharp to N. by W. for about half a mile to the anchorage, in 25 feet water, mud, with San Rita point bearing East, and the group of trees on the high ground at Real de San Carlos N. ½ E.

No sailing vessel should attempt to work through; and all vessels should allow for the current which at times sets strong towards Fisher's Bank.

The Hornos Islands lie 2 miles N.W. by N. of Lopez Islets; they consist of three small low islets lying in an East and West direction, with a channel of 16 to 19 feet between the two eastern. The best anchorage is 3 cables N.N.W. of the western islet, in 18 feet, mud.

The River Uruguay rises in Brasil, in the Sierra de Santa Catharina, and flows first West and then South, separating Brasil and Uruguay from La Plata, and falling into the Rio de la Plata, where its waters preserve their clearness for miles before they are lost in the muddy current of the Parana. Its whole length is nearly 900 miles, and it is navigable for vessels of about 12 feet draught as far as Salto 220 miles above Buenos Ayres, and for small steamers beyond it. The entrance of the Uruguay is 20 miles N.W. by N. of Martin Garcia.

A regular weekly communication is established between Buenos Ayres and the principal towns of the Uruguay as far as Salto.

The River Parana rises in Brasil, north-west of Rio de Janeiro. The upper streams of this river have various names; but as the confluence of the Rio Grande, the longest of them, with the Paranahiba, it takes the names of Parana, which it retains till it merges itself into the Rio de la Plata. The Parana flows southward, receiving several large affluents, and separates Paraguay from Brasil and La Plata. It then turns to the West, and flows in that direction for 50 miles, still forming the boundary between Paraguay and La Plata. It receives the Paraguay from the North, and at 13 miles to the south-west, at Corrientes, it again turns South and flows through La Plata into the river of that name.

The total length of the Parana is about 2,040 miles,—namely, 500 from the source of the Rio Grande to its confluence with the Paranahiba, 1000 from thence to the union of the Paraguay and Parana, and 540 from that point to the Rio de la Plata. In all the upper part of its course, as far as the province of the Missions, the river flows through a mountainous country, between scarped and tortuous shores, which renders it unnavigable. But below the Salto d'Apipe, the highest point a vessel can reach, the aspect and nature is quite opposite.

The only town of Parana where vessels with foreign commerce have much interest is Rosario, at 160 miles above the Boca de Guazu. Above Rosario there is nothing in the river to interest the commercial stranger.

The SOUTH COAST of the Rio de la Plata is low, uniform, and uncultivated; it is only visible from the offing by groups of trees which are scattered along the coast, making the navigation near it difficult. The coast is the termination of the pampas of Buenos Ayres, immense monotonous plains, resembling the deserts of Africa, which extend to the chain of the Cordilleras, rising 420 miles to the westward. There is no other vegetation than the rare ombu tree, and no water but that of the marshes formed by the rain.

The only inhabitants are a miserable tribe of Indians, who come a great distance from the south-west to pillage the estancias or farm-houses, situated on the frontiers of the province of Buenos Ayres. The complete absence of running water, and the saltness of the marshes produced by the great quantity of salt which is everywhere found on the soil, renders this country uninhabitable. These immense plains therefore will probably remain a long time deserted.

CAPE SAN ANTONIO.—*Rasa*, or *Flat Point*, the northern extremity of the ill-defined Cape San Antonio, the North end of a line of sandy downs, is a low sandy spit, extending to the northward and under water towards some breakers, near the northern limit of the Tuyu Bank. In clear weather this part of it may be seen from a distance of 8 or 10 miles.

The *Tuyu Bank*, called also Arenas Gordas, extends nearly 10 miles from the shore, and prevents even the smallest vessels from approaching this half-drowned land. The sea breaks on it at 1 mile from the shore, and on the North part of it, when the wind is from seaward. With the lead going there is no danger.

SAN BOROMBON BAY, formed between Cape San Antonio and Piedras Point, 55 miles to the N.N.W., is about 20 miles deep, and very shallow. The coast along the southern part of the bay is nearly level with the sea, and can only be seen by the stunted brushwood scattered here and there. It is only northward of lat. 36° S., where it rises a little, but not exceeding 20 feet, that it is at all visible from the offing.

The **Currents** set into or out of the Rio de la Plata, varying in their strength and duration as the winds vary, by which they are principally governed. Generally speaking, the current sets to the northward about N.N.W., at from 1 to 3 miles an hour, before and during southerly winds; and to the southward about S.S.E., at the same rate, before and during northerly winds.

It is high water, at full and change, off the cape at about 10^h; and the rise is about 6 feet. In fine weather the tides are regular, but with strong winds from the S.E. quarter, the water rises about 3 feet above the ordinary springs, and it falls with the winds from the N.W. quarter.

At *Rasa Point*, which forms the south-eastern extreme of San Borombon Bay, the low flat shore turns suddenly to the westward, forms a right angle, changes also a little in nature, and terminates suddenly, but so low that the beach of sand and shingle is almost blended with the sea.

The first remarkable group of trees, named Isla del Juncal, rise about two-thirds of a mile from the shore in lat. 36° 1′ S.. about 7 miles to the northward is the *Isla del Rodeo*, another group in lat. 35° 54′ S., and 8 miles southward of the mouth of the Rio *Salado*. *Mount Rosas*, a sandy down a little higher than the surrounding land, covered with trees, rises in lat. 35° 49′ S. to about 30 feet above the sea.

The *Rio Salado* is a shallow bar river, unfit for any but small vessels. At times, when the Plata is high, there are 6, 8, or 10 feet water on the bar. But at other times the smallest boat cannot even approach the mouth of the river. The *Rio San Borombon*, at 5 miles northward of the mouth of the Salado, is a small stream, and often dry, but which has a large quantity of water during south-east winds.

Between the Rio San Borombon and Piedras Point North of it, is a chain of small sandy downs, on which some trees are seen. The most remarkable is 6½ miles southward of the point, named *Mount Juan Geronimo*.

PIEDRAS POINT is the North extreme of San Borombon Bay, and the South point of entrance to the Rio de la Plata. The point is low, and projects very little: it is composed, not of rocks, as its name implies, but of *tuf*, a species of friable compact sandstone, and appearing to be of hardened mud. This stone, known in the country by the name of *tosca*, is formed in various places on the coast as far as Buenos Ayres, and forms a girdle of dangerous banks of 5 to 6 miles mean breadth. It is as dangerous to vessels which ground on it as the rocky bottom of the opposite shore.

The banks which border Piedras Point to a distance of 8 miles, and the low nature of the shore, require the navigator to use the utmost caution in approaching the coast.

Piedras Point, and that of Indio about 11½ miles to the north-west of it, is bordered by a bank of tuf and coarse gravel of from 6 to 8 miles in breadth. At 11 miles from the shore there are only 16 feet.

When very near the edge of the bank, the *Cerro de Salvador Grande*, on which are some trees, the *Isla de la Observacion*, on which is a remarkable isolated tree, 1 mile from Piedras Point, and the *Isla del Espenillo*, situated more than 2 miles to the south-west, can be seen. *Memoria Point*, low and a little projecting, lies N.W. by N. 7 miles from Piedras Point.

In estimating with the eye the distance from the coast, great errors are likely to be made; more so when in the La Plata, from the frequent effects of the mirage and extraordinary refraction, which lower and raise considerably the objects in view near the horizon.

INDIO POINT.—At about 5 miles further on in the same direction is Indio Point, and so low that a vessel can rarely close to recognize it. The pilots, however, often mistake it for the Cerro de Salvador Grande. Indio Point is low, covered with brushwood, more rugged than the rest of the coast, and on its extremity is a large tree. To the south-east are two groups of trees, and between them and the point is seen an uncultivated plain. The point may be seen in clear weather from a distance of 9 miles in 3½ fathoms water. From Indio Point the low shore runs to the north-west for about 22 miles to Embuda Point.

LIGHTVESSEL.—Between Indio Point and the Ortiz Bank, a vessel painted black, with three masts without yards or sails, having a black ball at the foremast head, is moored in 3½ fathoms water, at the distance of 8 miles N.E. ½ N. from the point, and 9 miles S. by W. ¾ W. from the south-east part of the Ortiz Bank. The vessel exhibits at the height of about 30 feet above the sea, a *fixed* white light, visible 6 or 8 miles. When pilots are on board a red and white diagonal flag is hoisted.

When to the north-west of Indio Point, the three first ombus seen are in the precincts of Magdalena, and further on the little village and church (having a large round white dome) of that name will be seen rising from a group of five or six others.

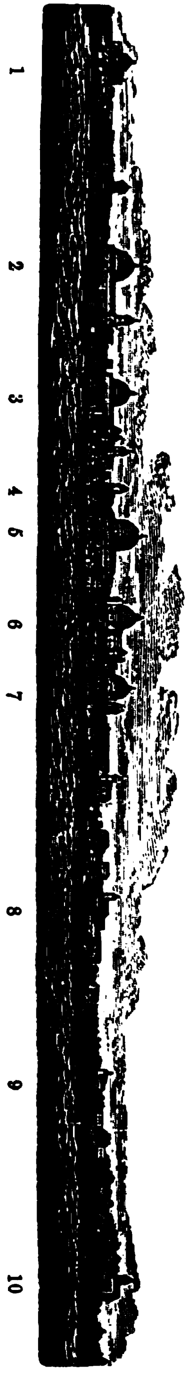
Embuda and Atalaya Points.—In front of Magdalena is a slightly projecting point with trees on it, named Embuda. To the north-west of Magdalena church is an ombu with a small group of trees, and a little further on a group of three others. *Atalaya Point*, at 11 miles to the north-west of that of Embuda, is low and sandy, and will be known by two small clusters of underwood on the shore, and an ombu with two houses. This point should be approached with caution, as it is stated the coast bank extends some distance from it.

Barragan Bay.—At the termination of the low coast, the wood of Santiago de la Ensenada de Barragan commences, and extends westward nearly 9 miles. The bay or inlet is open to the W.N.W. Santiago, the eastern point, is very low, covered with trees, and shoals for three-quarters of a mile to the westward, making it necessary to employ a pilot. The channel is about a cable in breadth, with only about 7 feet water, but 13 feet and more can be carried in when the water is high. The bay was formerly deeper. In the middle of last century large vessels unable to go to Buenos Ayres entered this bay. It has been proposed to construct piers at this port, at which vessels may discharge and load; and to connect them by rail with Buenos Ayres.

It is high water at Barragan Bay, full and change, at 7^h; and the rise is from 5 to 9 feet.

Vessels bound to Barragan Bay for mules, anchor 2 or 3 miles from it, near *Lara Point*, which is a little higher than the surrounding coast, and remarkable by a large isolated ombu. A little westward of the point is a cluster of underwood, and some hillocks forming the land of *Quilmes Point*.

LAS PALMAS BANK.—The flat of Las Palmas is a great bank formed by the sand brought down by the Uruguay and the Parana, which spread over the whole of the upper part of La Plata. The depths over its outer part are from 2¼ to 2¾ fathoms, over its inner part from 1¼ to 1¾ fathoms, and shoaling still more near the mouths of the great rivers. Vessels leaving the outer road of Buenos Ayres for Colonia or the Martin Garcia Channel, should take into consideration the vessel's draught and state of the river, and steer to the eastward, borrowing either way towards the edge of the flat according to circumstances.



VIEW OF BUENOS AYRES, FROM THE NEREUS ANCHORAGE IN THE OUTER ROAD.

REFERENCES.—1. *Residencia.*—2. *S. Domingo.*—3. *S. Francisco.*—4. *Cabildo.*—5. *Cathedral.*—6. *S. Miguel and Mole Head.*—7. *S. Merced.*—8. *Santa Catalina.*—9. *Socorro Chapel.*—10. *Recoleta Spire.*

BUENOS AYRES, the capital of the province of the same name, was founded in 1535, and stands on the right bank at the head of the estuary of the Rio de la Plata, on a vast plain which is here about 35 or 40 feet above the sea, and which extends westward to the Andes. The level uniformity of its outline is only broken by the spires of various churches. The streets are regular and straight, intersecting each other at distances of about 150 yards, forming squares like a chess-board. The houses have never more than two storeys, and commonly only one.

The cathedral has a handsome dome, and a portico with twelve Corinthian pillars. There are several churches, including an English one, and a Presbyterian chapel. From San Miguel tower, 68 feet high, a little westward of the cathedral, the true bearing of the North Cerro de San Juan on the Banda Oriental coast is North 39° 41′ 34″ E. There are two wharfs or piers, from 220 to 330 feet in length, the first, near the church of la Merced, for passengers, the second, in front of the custom-house, for merchandise, but they are not long enough, and inconvenient when the river is low from N.W. winds.

Buenos Ayres has a considerable trade. All kinds of supplies, including coal, but excepting meat, are at a very high price.

Light.—At 4½ miles N.E. by E. ½ E. from the custom-house at Buenos Ayres is a hulk or stationary guard-ship, painted black, with three masts, which shows a *fixed red* light, visible 6 miles.

OUTER ROAD.—There are two anchorages in front of Buenos Ayres, formed by the City Bank and that of the Camaron, an extension or tongue of the great Palmas Flat. Both are anchorages exposed to the winds from S.E. to E.N.E., which often bring in a heavy ground swell. Vessels frequently drag, foul each other, and sometimes go on shore. It is necessary to have good ground tackling, to be cautious not to ground on the anchors, and to give a berth to the buoys of vessels in the road to prevent grazing on their anchors The bottom is a fine dark sand; within the 12 feet line of soundings it is generally hard, and to 16 feet hard and soft, beyond 15 it is mostly soft muddy sand. There are always a large number of vessels lying here.

There are several dangerous sunken vessels in the roads; two nearly close together, showing at low water, lie in the outer road in line with the Catalina channel, and one farther in, and are marked by beacons. The great or outer road northward of the city bank, at about 3½ miles from the shore, is from 3 to 4 miles in length in a N.W. and S.E. direction, and from a half to three-quarters of a mile in breadth, with depths of 18 to 21 feet over soft mud. At the entrance to this anchorage there is a bar or flat with only 15 feet water on it at the mean level of the river, and at times not more than 12 feet, which obliges vessels of moderate draught to anchor at 6 or 7 miles from the town in 17 feet water, with the Residencia in the southern part of the city bearing S.W. by W.

The domes of the churches and the vessels at anchor in the outer road are seen at a distance of 10 or 11 miles. The bottom on the city bank or that southward of the outer road being hard, it is necessary to keep a little to the northward. Having passed the bar, the soundings slowly increase, and the bottom becomes softer; when in 17 feet water, soft mud, steer to the westward, and anchor in about 20 feet, with the guard ship bearing S.E. by E. ½ E., distant 2¼ miles; la Residencia, S. by W. ¾ W.; the custom-house, S.S.W. ½ W.; and the church of la Recoleta, N.W. of the town, S.W. ¾ W. A good berth will also be found near the sunken vessels, where the water is deepest and the position convenient for boats. It is not usual to moor in the outer roads, but to veer a long scope of cable, and be ready to drop a second anchor with south-easterly winds.

INNER ROAD.—The inner or little road off the N.E. angle of the city is a space of about 1½ mile in length, in a N.N.W. and S.S.E. direction, and about 3 cables in breadth, having 12 and 13 feet water. It is formed between the City bank and the coast, the latter is bordered with a bank of rotten stone. To the northward of the inner road is the anchorage El Pozo, having about a foot more water. Vessels in the Pozo and inner road always moor N.E. and S.W., and great attention should be given to prevent grounding on the anchors, for frequently there are only 8 or 10 feet water, and vessels are often aground and unable to go to sea for 15 or 20 days. A large number of vessels are always here.

In proceeding from the outer road to this anchorage, steer N.W. by W. for about 2 miles, until a remarkable umbrella tree, West of the town and about one mile from the shore, is on with the N.W. part of a grove of trees on the plain near the shore, bearing S.S.W. ¾ W.; or the church of Recoleta bears S. by W., then steer on either of these lines across the West part of the City bank over soft bottom, in from 10 to 13 feet water at the mean level of the river, until 1½ mile from the shore; when about a S.E. ½ S. course will lead to the anchorage. The depths of water over this part of the bank are about the same as elsewhere, but this track is chosen on account of the soft nature of the bottom.

The Catalina channel, south-eastward of the above, is a depression in the City bank, but the bottom is harder; it is much used by vessels under 10 feet draught. The leading mark through is a white house near Palermo Chico, a large white house with an arched piazza, in one with the umbrella tree, bearing S.W. by W. ¾ W. But as the banks are constantly shifting, it is necessary, when going into the inner road, to employ a pilot, and particularly for the purpose of choosing a clear berth, and avoiding the many lost anchors in the roads.

Winds.—During summer, between August and March, the winds are from the eastward. About noon, if the barometer is in a mean state, it is generally calm or little wind, which freshens from the south-eastward towards sunset, when it blows fresh, veers to the northward during the night, and becomes calm again about noon. In April, May, June, and July, the weather is variable. The barometer always rises with a S.E. wind, which brings clear dry weather; falls for a pampero or S.W. wind, but falls lowest with the wind from North to West, which brings cloudy rainy weather. It may be fine weather at sunset, and two hours after blowing a gale, but the barometer is sure to indicate it.

Tides.—It is high water at Buenos Ayres, full and change, at about 12^h; and the rise may be from 3 to 5 feet. The flood runs 5 hours, and the ebb 7 hours, at from 1 to 2 miles an hour. In fine weather the tides are generally regular, but with a fresh breeze they are in a measure irregular. The winds from the S.E. cause the water to rise, and those from the N.W. depress it, and in some places cause a difference of 12 feet. A case has occurred when the wind from the N.W. has so depressed the water, that a person was able to walk dry to the vessels anchored in the inner road.

Rio Riachuel.—At about a mile southward of the town is the little river Riachuel, with 13 to 16 feet at low tides, over soft mud, which serves as a port of commerce to Buenos Ayres. This river being the deepest on the South coast, was the cause of the town being placed on the neighbouring plain. Its mouth is obstructed by banks, so that vessels drawing less than 10 feet alone can enter when the water is high from the S.E. winds, 3 feet only being on the bar at low tides. Large numbers of coasters here load and unload. The saladeros, where the beef, hides, &c., are prepared, are principally established at *Barracas*, a little village 2 miles above the mouth of the river.

BANKS IN THE RIVER.—It is necessary to bear in mind that great changes are constantly taking place in their form and positions, caused by the continued deposit of sand brought down by the Parana and the Uruguay. It is therefore necessary not to trust entirely to the charts or directions in a vessel of more than 16 feet draught, and it will always be prudent to have the aid of a pilot.

The greatest part of the sand brought down by the rivers is deposited on the Palmas and Ortiz Banks; another part carried through the channel stops on the Santiago, Chico, Cuirassier, and other banks, which are continually increasing. The two principal channels along the shores of this estuary are being obstructed slower than other parts of the river; their beds are formed of layers of soft mud which indicates their course, and is the best guide for a vessel when the land is not seen; thus the bottom is more or less soft in the channel, and more or less hard on the banks.

Soundings.—Between the parallel of 34° 30′ and 36° 0′ S. the lines of soundings follow a direction nearly parallel to the coast, or N.E. and S.W., and decrease regularly at right angles towards the land. The depth increases to the southward and to the eastward, and decreases to the northward and to the westward. At 60 or 75 miles beyond the mouth of the La Plata the waters lose their blue tint and assume a yellowish green colour.

On the parallel of 34° 0′ S., at 75 to 90 miles from the land, there are 67 fathoms water; at 50 miles from the land there are only 22 fathoms, mud, sand, and shells; from the latter distance the depths diminish rapidly towards the land. In the lat. of the Castillos, 34° 25′, at the distance of 90 miles, there are from 55 to 57 fathoms water, black mud; and continuing westward on that parallel, sandy bottom, which is on the whole coast, will soon be found; within 40 miles of the land there are only 20 to 22 fathoms.

In the latitude of Lobos and on the meridian of 52° 25′ there are 93 to 99 fathoms, muddy sand; to the North the depth decreases. On the parallel of Cape St. Maria, and on the above meridian, there are only 58 to 63 fathoms, and on running South on the same meridian the bank bordering the coast will soon be lost.

Between the parallel of 35° 30′ and that of Cape San Antonio, the bottom is sand mixed with shells and gravel.

La Plata Bank.—At the entrance to the Rio de la Plata, between the meridians of Maldonado and Cape Castillos, is a remarkable bank, with an average depth on it of from 11 to 14 fathoms, fine sand and broken shells. It extends N.E. and S.W., as if formed by the currents, parallel to the coast, at a mean distance of 42 to 46 miles, having but little breadth, and reduced in places to a few hundred yards.

The ENGLISH BANK, a dangerous rocky shoal, partly covered with sand, and dry in several places at low water, on which the sea continually breaks over a space of from 3 to 4 miles, lies nearly N.N.W. and S.S.E., 12 miles in length, and 7½ miles in extreme breadth. From its North end Flores Islet Lighthouse bears N. by W. distant 11 miles, and Monte Video Lighthouse N.W. by W. ½ W. 21½ miles. The soundings eastward of the bank are very irregular, and at the distance of from 8 to 14 miles are several shoal patches of from 4½ to 6 fathoms water, apparently forming another bank of about 18 miles in length, North and South, with depths of 8 fathoms between it and the English bank. The bottom on this shoal ground is mud and sand, whilst that eastward of it is sand and broken shells.

There are 6 and 7 fathoms water close to the North end of the English bank, but a vessel southward of this parallel will pass over the shoal water eastward of it, and if common precaution is taken with the lead, the approach towards the bank will be indicated. To the northward of the bank the depth will not be less than 7 fathoms until westward of its meridian. Should a vessel have occasion to anchor near it, the anchor should not remain long in the ground, as from the stiff nature of the bottom there will be great difficulty in lifting it.

A bell buoy, 4½ feet high, was placed on the south-east side of the bank in 20 feet water, sandy bottom, in lat. 35° 16′ S. The bell has been stolen, it is said, and the buoy has been removed.

The English Bank Lightvessel is off the North end, and is painted red, having three masts, and which exhibits a *fixed* white light, visible 6 or 8 miles; but the light should not be too much depended upon, as it shows only for 6 or 8 hours, through the neglect of the watchman to supply it with oil. The vessel lies in 7 fathoms water muddy bottom, at 4 miles N. by E. of the North point of the breakers, and about 2½ miles from the nearest part of the shoal.

The Archimedes Bank, discovered by an English frigate of that name, is westward of the English bank, and extends over a space of about 6 miles, having on its centre 2¾ fathoms water, near its South end only 1¼ fathoms, and on other parts of the bank from 3¼ to 4½ fathoms. The bank is composed of sand, whilst to the northward and westward the bottom is mud, or sand and mud. It should not be approached unless in a vessel of very light draught, nearer than 5 fathoms water. Between the Archimedes and the English bank there is a channel nearly 4 miles wide, with 5¼ and 5½ fathoms in it, sand and mud.

BANKS SOUTH OF THE ENGLISH BANK.—There are several sandbanks southward of the English bank, but their extent and positions are not yet well ascertained. The *Meduse Bank*, with 3 fathoms water on it, is nearly on the meridian of Monte Video, and in the parallel of 35° 24½′ S. The *Narcisse Bank* and several other patches, with 3½ fathoms on them, lie to the south-westward and the south-east of the Meduse, between the parallels of 35° 28′ and 35° 35′. The *French Bank*, with 1½ fathoms on it, occupies a place on the chart in lat. 35° 43′, long. 55° 37′ W. This shoal was reported by the Spanish captain Famadas in 1803, and Oyarvide was sent and searched for it for two days, at the place indicated without success. A depth of 5½ fathoms was found a little southward of its assigned position, and also a bank at 17 miles W. by S. of the same place.

Aizpurua reported the existence of a shoal in lat. 35° 50′ S., long. 55° 20′ W. In December, 1835, the brig *Véloce* grounded on a sand-bank with 13 feet on it in about the same lat.

The *Rouen Bank*, with 17 feet water on it, was found by Capt. Frement, of the *Ville de Rouen*. From the eddy and colour of the water it was thought that a less depth may be on it. Montravel places it in lat. 35° 44′, long. 55° 58′; and the East end of the Astrolabe Bank, which extends eastward from it, in lat. 35° 46′, long. 55° 45′. Between the two positions there are 4½ and 5½ fathoms, hard bottom. The pilots of Buenos Ayres say the Astrolabe changes its position, but this does not agree with the nature of the bottom.

The Cuirassier, or *Banco Nuevo*, on which the French brig of the former name grounded a few years ago, has 2¼ fathoms water on it. Its N.W. end is N. by E., distant 12 miles from Indio Point; and its S.E. point N. by E. ¾ E., 11 miles from the same point, and N. by W. about 6 miles from Indio Point Lightvessel. Between this bank and the Ortiz there is a channel a mile in breadth, and about 4 miles in length, having 3 and 3½ fathoms water, mud, and mud and sand. To the southward of the Cuirassier, between it and the bank bordering the coast of Buenos Ayres the depths are 3¼ to 3¾ fathoms, with the same bottom.

The ORTIZ BANK begins near Colonia, borders the coast eastward as far as the outlet of the rivers Pavon and Pereyra, a distance of about 37 miles, and extends in a tongue to the south-eastward across the La Plata, terminating at 14 miles N.N.E. of Indio Point. It may be about 57 miles in length, with an average breadth of 15 miles; the least water on it is 1¼ fathoms near the extremity of the tongue; in the centre the depths vary from 1¾ to 2½ fathoms; and along its North part, at 4 miles from the shore, the bottom is remarkably level, the depths being from 2 to 2½ fathoms.

The bottom is sand, or rocks covered with sand, which the seaman should take into consideration in crossing with a vessel of light draught, as well as the state of the river. The bank may be approached on all sides by the lead, the soundings gradually decrease, and the mud becomes mixed with sand; the only fear is getting in one of the indentations of the bank more or less deep, and known by the pilots under the name of saccos. A vessel should not go nearer than 3 fathoms water.

The Ortiz bank forms two channels, one along the North coast, which is long, narrow, and practicable only for vessels of about 12 feet draught. The other on the South, northward of the Chico Bank, which is deep, and more frequented.

The CHICO BANK lies in the middle of the channel between the Ortiz Bank and the coast of Buenos Ayres. It is composed of hard sand, about 8 miles in length in a N.N.W. and S.S.E. direction, and 2 miles in breadth, with 10 feet on it at low water, and steep-to on the North and East sides. Its S.E. point is N. by E. ⅜ E. from Magdalena church, and about 8½ miles from the coast; and its North end is N.N.E. ¾ E. from the ombu tree of Atalaya.

Between the bank and the coast of Buenos Ayres there is a channel of about 4 miles in breadth, navigable for vessels under 15 feet draught by steering along the coast by the lead. The channel between the Chico and Ortiz Banks has from 4 to 5 fathoms water, muddy bottom, which is carried as far as Santiago Point; from thence the soundings decrease gradually to about 2½ fathoms at the bar of Buenos Ayres.

Chico Bank Lightvessel, painted red, with two masts, is moored in 4 fathoms water off the North end of the bank, which exhibits a *fixed* white light, visible 6 or 7 miles. The vessel's position is often doubtful after gales.

The Coast Bank, from Cape St. Antonio to Buenos Ayres, extends along the whole shore, at a distance of about 3 to 12 miles. In the great bay of San Borombon it is soft mud to near the vicinity of Piedras Point, where it is hard mud and tosca, from Magdalena to Buenos Ayres it is sand, or sand and mud.

Santiago Bank.—To the northward of Santiago Point is the bank of the same name, having 1½ fathoms water on it, with its outer edge about 6 miles from the shore. It is steep-to, and should not be approached nearer than 3½ fathoms. The channel into Barragan Bay is, along the coast from the eastward, or if from the westward of the shoal, between it and that extending from Lara Point. To the westward of Lara Point is the S.E. extremity of the bank stretching from the front of the town of Buenos Ayres; the first part is called the Bank of Quilmes, and the latter the Ciudad or City Bank. It is composed of sand, or sand and mud. The outer road of Buenos Ayres is formed between this bank and the Palmas flats.

GENERAL DIRECTIONS.—Making the land at the entrance of the Rio de la Plata does not present any great difficulty. The inconvenience is caused by the frequency and suddenness in the changes of the weather. The latitude is of the greatest importance, and no opportunity should be lost in obtaining it either by day or night, whenever the state of the weather will admit, and, with the lead, the vessel may be navigated with safety. The best parallel for entering the river is that of Lobos Islet.

On this parallel, in longitude 52° 25′ W., in about 90 to 98 fathoms water, steer westward, so as to pass 30 miles southward of Cape St. Maria, where there are 18 to 20 fathoms water.

Before reaching the meridian of the cape, a vessel will pass over the northern part of the La Plata Bank, in 11 to 14 fathoms water. Allowance must be made for the current according tu the direction and force of the wind, bearing in mind that with the wind from S.E. it sets strong towards the coast. If set to the southward the depth will increase slowly, the bottom being fine sand; if, on the contrary, the vessel is set to the northward, the soundings will decrease rapidly, and the bottom is sand and broken shells. The nature of the bottom and the change of depth will assist in indicating the course followed, and as a vessel proceeds westward the chart is the best guide; but mud and sand will be found on the parallel of Lobos, and muddy bottom is a sure indication of being in the fairway.

Several vessels are yearly wrecked on the English Bank by not paying attention to the lead, and particularly to the nature of the bottom. To the westward of Lobos Islet, with a scant or beating wind, the North shore should be kept aboard, as it is bold; there are no out-lying dangers at the distance of 5 miles from it, and the weather is seldom so thick for any length of time that the land cannot be seen. The nature of the bottom is mud, and the decrease of soundings to the westward will indicate an approach to Flores Lighthouse. With a fair wind, if a vessel is to the southward out of the channel, the bottom will be sand, especially near the English Bank, whilst in the channel the bottom is pure, soft, blue mud.

With a steady N.E. breeze, Cape Castillos should be sighted, when the vessel, aided by a favourable current, can run along the land. If, however, the wind should be from South to S.E., or the weather uncertain, by sighting the cape a vessel will be to leeward, with a strong current against her, and a heavy swell setting towards the coast. It would therefore be necessary, with South or S.E. winds, to keep a little southward of the parallel of Lobos, and steer so as to sight that islet in a West or N.W. direction. Cape St. Maria is low, difficult to be seen, and should not be steered for.

Between the parallels of 34° 30′ and 35° 30′, at 9 miles from the coast there are from 14 to 16 fathoms water; at 18 to 24 miles from the coast there are 38 fathoms; and between 81 to 84 miles from the coast 82 fathoms. Attention should be paid to the soundings over La Plata bank, and the river should not be entered before a vessel's position is well ascertained by sighting Lobos or the surrounding lands, which in fine weather will be seen at a distance of from 15 to 25 miles. As Cape San Antonio, the South point of entrance, is low, and seen only at the distance of a few miles, a vessel from the southward, in the absence of observations, must depend entirely on the lead; and in proceeding for Buenos Ayres, Indio Point light will probably be the first thing seen, at a distance of 6 or 8 miles. From the vessel a pilot may be obtained.

In entering the Rio de la Plata southward of the English Bank, the seaman should be certain of his latitude, and steer on the parallel of about 35° 36′ northward of the Rouen Bank, taking into consideration the state of the wind and sea; or run on the parallel of 35° 56′ South of the Rouen, but carefully avoiding the parallel of 35° 45′. Being in 9 or 10 fathoms water, continue westward in regular soundings until in 6 fathoms, muddy bottom; then steer N. ½ E. until Monte Video is seen, keeping in muddy bottom. Should the wind be from South round by West to N.W., neither the English nor Archimedes Banks should be approached too close.

The bottom northward of the parallel of 35° 30′ and eastward of the meridian of Monte Video, is sand sometimes mixed with shells; whilst westward it is mud, with the exception of the tosca off Piedras Point, and the Ortiz Bank, which is sand.

Monte Video to Buenos Ayres.—It is customary for vessels from Monte Video to Buenos Ayres to employ a pilot, and unless the mariner has some knowledge of the navigation of the river, it is almost indispensably necessary for those of more than 16 feet draught; for although the channel is marked by Indio Point and the Chico light-vessels,* at certain places it is narrow, and the edges of the bank are liable to change after gales or extraordinary tides. The pilots alone can be acquainted with these periodical changes, but they should not be trusted too much, though their services are still at a high price, and those only known to the place should be employed. As the banks are often steep-to, the least neglect in the steerage may cause a vessel to ground; great attention should therefore be given to the navigation, even with a pilot on board.

Vessels of less than 9 feet draught can almost always steer across the Ortiz Bank in a direct line. The North channel is seldom used except by coasters. In proceeding through either channel it must be borne in mind that when in the fairway the bottom will be soft mud, and the nearer the banks are approached the more the mud will be found mixed with sand, and the bottom harder, as near all the banks sand predominates. Almost everywhere near the banks in the Rio de la Plata, the upper stratum is a mixture of black mud and sand, whilst the second, which is reached by the anchors, is stiff clayey mud.

The SOUTH CHANNEL.—In leaving Monte Video for the South channel to Buenos Ayres, steer about S.W. by W. for Indio Point lightvessel. The course should be carefully preserved by the bearing of the Cerro as long as it is in sight, which in fine weather will be at a distance of 28 or 30 miles, and which should be carefully measured. Although this part of the bed of the river is nearly flat, great attention must be paid to the lead. Should the soundings decrease to 3 fathoms, before the necessary distance is made good, a vessel will be on the edge of the Ortiz Bank, but should they increase to 4½ fathoms or more, she will be some distance to the south-eastward, bearing in mind that the bottom is more or less soft in the channels and more or less hard near the banks. If calm or thick weather it will be prudent to anchor.

At the distance of 1½ or 2 miles North of the lightvessel, steer N.W. ½ W. about 28 or 30 miles, making due allowance for the current, the direction of which will probably be seen in passing the lightvessel; the ebb sets strong to the southward, and the flood to the north-westward. With Indio Point bearing S. by W., distant 10 miles is the centre of a patch of tosca, extending E.S.E. and W.N.W. over a space of about 3 miles. When the Chico lightvessel is seen, steer so as to pass northward of her, then about a W. ¾ N. course made good will lead to the guard ship and over the flats to the outer road of Buenos Ayres. Should the Chico lightvessel not be seen, in consequence of thick weather, or being out of her proper position, skirt the edge of the Ortiz Bank by the lead.

Between the Ortiz and Chico Banks is the deepest part of the channel, the depths increasing near the former bank. It is scarcely known of a vessel grounding on this edge of the Ortiz Bank, but several have grounded on that of the Chico. From the Chico lightvessel the soundings westward are regular as far as Santiago Bank, when they gradually decrease to Buenos Ayres.

If from circumstances a vessel should take the passage southward of the Chico Bank, from Indio Point lightvessel skirt by the lead the edge of the bank bordering the coast by keeping the lightvessel southward of an E.S.E. bearing, and always in muddy bottom. When Magdalena church bears about S.S.W., a vessel will have arrived at the entrance to the passage, which is encumbered with two banks having 16 and 18 feet water over them. Continue along the coast in not less than 3½ fathoms, and when the ombu on Atalaya Point bears S.W. by S. a vessel will be westward of the Chico lightvessel.

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* The mariner is warned that these vessels, after a heavy pampero, are often out of their proper positions. In September, 1863, the Indio Point light-vessel was 3½ miles to the north-west, and H.M.S. *Curlew*, although steering wide of her to the south-east, grounded on the Ortiz Bank. The lights of vessels at anchor must not be mistaken for those of the lightvessels.

From Indio Point lightvessel to Buenos Ayres, the navigation for a sailing vessel presents some difficulties, unless with a fair wind, and at all times requires great attention. If the current is very strong, more than 1½ knots, it will be more prudent to remain at anchor. In working to windward keep the Indio Point lightvessel as near as possible on a S.E. bearing as long as she is in sight, and then do not stand nearer than 3½ fathoms on either side.

When in the vicinity of the Chico Bank the ombus of Magdalena will be seen; they should not be brought to bear southward of S.W. by S. until on the North side of the channel. The Ortiz Bank should now be kept aboard. When the ombus bear S.S.W. a vessel will be between the Ortiz and Chico Banks; they can be seen from aloft in the middle of the channel in clear weather, but will be lost sight of in 3 fathoms near the Ortiz Bank.

The Chico Bank is one of the most dangerous in the La Plata; a vessel should approach it with the greatest caution, not too close, and the lead should be hove quickly. To the westward of the Chico, a vessel will have no difficulty in tacking on either side of the channel at a prudent distance from the edge of the banks, bearing in mind that Santiago Bank is steep-to. If bound to Colonia or the Hornos Islands, steer by the lead along the edge of the Ortiz Bank until the islets at the entrance to Colonia are seen; then steer eastward or westward of the Farallon, according to circumstances.

Vessels leaving Buenos Ayres for the south-eastward, should steer in mid-channel for the lightvessel on the North end of the Chico Bank, preserving the course by the bearing of the guard-ship as long as she is in sight; and the bearing of Barragan trees will indicate an approach to the bank. Should the Chico lightvessel not be seen, on account of fog or other cause, the edge of the Ortiz Bank should be skirted by the lead, and when sure of being eastward of the Chico Bank, steer for Indio Point lightvessel, making due allowance for the tide, and keeping the lead going.

CURRENTS and TIDES.—The general movements of the waters in the La Plata are greatly influenced by the direction and force of the wind. With fine weather and light breezes there is some degree of regularity in the tides. The mouth of the estuary being wide and shallow, the water flows easily in when the wind is from seaward, and is forced rapidly out when the wind is off the land. The variations of the winds have such an influence on the movements of the waters, that there is nearly always a possibility of foreseeing the alterations in the weather, from a daily observation of the current and height of the water.

Before the winds from the south-east and seaward are felt on the coast, the level of the river begins to rise at the shore of Buenos Ayres. For several hours, and sometimes for a whole day before a pampero, the water is seen rising in the port of Monte Video. When the current runs to the westward along the North coast of the La Plata, a N.E. wind may be expected.

Before stormy weather, or gales from S.W. or S.E., the current sets into the river and the water rises to a height in proportion to the duration of the bad weather. At times the difference between high and low river is as much as 20 feet. The winds between N.N.E. and W.N.W. cause the river to fall the lowest; the down current is then stronger along the South coast, but it seldom exceeds 3 miles an hour; on the North bank it is inconsiderable. The pamperos cause a rapid flow of water in the port of Monte Video, but it does not last more than three or four hours from the beginning of the gale, and is followed quickly afterwards by a strong ebb, which causes the vessels to swing broadside to the wind and sea, and especially along the wharves of the town.

When the wind is from N.E. for some time, the waters flow to the westward along the North coast, whilst they are falling and running to the eastward along the South coast; and during the time the wind remains between S.E. and N.E., the current flows generally to the westward, beyond Monte Video, without much increasing the depth to that point, while it fills up the river above the banks. With the winds from

N.N.E. to W.N.W., the water falls and runs rapidly along the South shore beyond Indio Point, while it is imperceptible to the northward.

When gales from the North, or winds from N.W. to East prevail, the river falls a great deal, and the current runs to the S.E. and South; and when pamperos prevail, the river rises and the current flows to the N.W., West, or S.W., according to the direction of the channels.

The movement of the waters at Buenos Ayres are more regular than at other parts of the La Plata. The flood here runs $5^h\ 20^m$, and the ebb $7^h\ 5^m$.

If the water rises for a longer time than the duration of a tide, in a calm or light breeze from N.W. to S.W., it may be inferred that the wind will blow from N.E. to S.E., and that it already blows from that quarter at sea. The mean rate of the current is from 1 to 2 miles an hour, and it is seldom more than 3 miles. It has, however, been found running to the eastward at the rate of 5 miles an hour, at 5 miles W.S.W. of Lobos Isle.

During the months of March, April, and May, the Rio de la Plata is higher than in the other months of the year, on account of the rising of its tributary rivers, which carry away whole trees, brambles, and weeds, and which form into small masses like islets, sometimes rather large, and known by the natives under the name of Camalotes.

Ground Log.—From what has been said of the irregularity of the currents in the La Plata, and the importance of knowing a vessel's position, it will be easily seen how useful the ground log may be made, which alone in the absence of land, &c., can indicate the strength and direction of the current; but notwithstanding its simplicity we fear it is seldom in use. We cannot call too strongly the attention of the mariner to this subject when the depth of water will admit of its use. The very smallest line that will haul in a lead of 5 or 6 pounds weight is the best. The lead should be rounded, long, and tapered at each end, in order that it should sink fast and be hauled in easily.

DIRECTIONS FOR BEATING FROM POINT INDIO TO BUENOS AYRES BY DON BENITO AIZPURUA.

Don Benito Aizpurua was selected by the government to place several large buoys upon the edges of the channels leading to Buenos Ayres, which task he effected with much skill and judgment; but his labours were soon nullified, as these useful monitors were carried away by the bad weather. Don B. Aizpurua also assisted M. Barral, in the *Emulation*, during his survey of the river, in 1830-32.

1. Being between Point Indio and the S.E. point of the Ortiz you can run from 18 feet on either side, upon the bank or upon the coast.

This is with vessels drawing 15 feet, but with those which draw but 12 feet you can keep on to 15 feet, as neither the Ortiz or the bank of soft stone lining the shore are steep-to.*

2. This manner of proceeding can be kept from Point Indio until you are up to the S.E. point of the Chico Bank.

3. When you arrive in the neighbourhood of the Chico Bank, the six or ombus of the village of Magdalena will serve as a mark.

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* The lightvessel, previously described, has been stationed since these directions were written.

4. As long as the ombus bears S.S.W., by compass, you can tack without fear, as we have just shown.

5. In running these boards you find there is a greater depth by the side of the Ortiz, as shown by the chart.

6. When the six or eight ombus of the Magdalena lie to the S. by W., you have entered the channel between the Ortiz and Chico Banks.

7. You can sail with confidence towards the shore, for you may see the ombus from the mast-head of an ordinary vessel before you arrive at the Chico Bank.

8. In 18 feet water on the edges of the Ortiz you cannot see the ombus; but in clear weather, from the middle of the channel between the two banks, you may descry them from the upper part of the rigging.

9. Between the S.E. point of the Chico and the Ortiz you will not find but 23 feet water, when the river is low.

10. Between the Ortiz and Chico, after having passed the centre of the latter, which is 9 miles long, the lead shows 35 feet.

11. From this depth of 35 feet, steering W.N.W. by compass, you will have doubled it when there is but 23 feet.

12. From this point, steering W. by S., the depth increases again to 35 feet, and then you will see Ensenada.

13. When the depth diminishes to 30 feet, and when you have well made Ensenada, place your head W. by N., and this will take you direct to the outer road of Buenos Ayres.

When you have come up between the Ortiz and Chico, in your boards towards the Ortiz, you can run to 20 feet without fear; and when you approach the Chico, when it is lessened to 23 feet, you should veer, as this bank is very perpendicular.

Having passed the Chico Bank you can tack in 18 feet on either side, as between Point Indio and the Chico.

The channel between the banks is preferable to that near the land, as it is wider, and the depth greater.

From the S.E. of the Chico Bank to the Ortiz the distance is 9 miles, and from the N.W. point of the same bank it is 7 miles.

Aizpurua does not mention the Nuevo Bank, although it was already formed when his directions were printed. Few pilots know of its existence, although it is now better known: several vessels have touched on it.

From fear of meeting with it you will do well not to prolong your boards to the North, and keep more upon the stony bank of the coast than further out; at least if the height of the river and the draught of the ship will not allow you to cross it, and run on as far as the Ortiz.

When you have the depth of 18 feet on the flat of stone, and you are certain of having doubled the N.W. point of the Nuevo Bank, there is nothing to hinder you from tacking between the coast bank and the Ortiz, according to the size of your vessel, without, at the same time, coming into less than 18 feet water on the bank, for fear of getting into one of those cuts in it previously mentioned.

If there is a downward current you must anchor, for you will gain nothing by beating against this current

After you have passed the bar of the great road of Buenos Ayres, your boards will be short; scarcely will you have put the ship about before you must prepare to do so again, having at least, as yet, 1 foot water under your keel.

IX.—THE COASTS OF LA PLATA AND PATAGONIA, FROM THE RIVER OF LA PLATA TO THE STRAIT OF MAGALHAENS.

The COAST of the PAMPAS, or Plains of BUENOS AYRES, extends from the River Plata to the *Rio Negro*, or *Black River*, lat. 40° 55′. It is entirely flat, and destitute of harbours. The interior is one vast plain, mostly covered with grass and clover, the food of millions of horned cattle and wild horses. The maritime part next the sea has been called, by the Spaniards, *El Pay del Diablo*, or the Devil's Country; yet the coast may be approached with safety, as the soundings are regular.

PATAGONIA extends from the Rio Negro to the Strait of Magalhaens, and is divided into Eestern and Western Patagonia by the Cordillera of the Andes.

TIERRA DEL FUEGO takes in all the islands southward of the Strait of Magalhaens (including Staten Land), as far as the Diego Ramirez Islets.

The country inhabited by the Patagonians is open, and, generally speaking, rather level, with occasional hills, and some extensive ranges of level-topped heights (steppes.) There are very few trees, and water is scarce. The eye wanders over an apparently boundless extent of parched, yellow looking, semi-desert, where rain seldom falls, and the sky is almost always clear. During a few days in each year, or perhaps at intervals of two or three years, the rain pours down in torrents. The heats of summer are very great; but in winter, though the days are not cold, the frosts at night are severe; and at all times of the year, in the day time, strong winds sweep over the plains.

On the coast of the Indian country, and Patagonia, to the southward, there is not a single place of trade. The whole is occupied by various nomadic or wandering tribes, and the southern part is under a cold and cheerless climate. The latter was discovered in 1519, by Fernando Magalhaens, generally called Magellan, and who first passed through the strait which bears his name.

The aborigines are a tall and extremely stout race of men. Their bodies are bulky; their heads and features large, but their hands and feet are small. Their limbs are neither so muscular nor so large boned as their height and apparent bulk would induce one to suppose; they are rounder and smoother than those of white men. Their colour is a rich reddish brown, rather darker than that of copper, yet not so dark as good mahogany.

Nothing is worn upon the head except their rough, lank, and course black hair, which is tied above the temples by a fillet of platted or twisted sinews. A large mantle, made of skins, sewed together, loosely gathered about them, hanging from the shoulders to the ancles, adds so much to the bulkiness of their appearance, that one ought not to wonder at their having been called gigantic. Among 200 or 300 natives ef Patagonia, scarcely half a dozen men are seen whose height is under 5 feet 9 or 10 inches; the women are proportionally tall; there are also among their number many who are slight and of low stature.

The north-eastern portion of Tierra del Fuego is a better country than Patagonia. The woody mountains of the south-western islands are succeeded, towards the north-east district, by hills of moderate height, partially wooded; northward of which are level expanses almost free from wood, but covered with herbage adapted to the pasturage of cattle.

The climate is a mean between the extreme of wetness and drought, which are so much felt by the neighbouring regions.

The Tekeenica, natives of the south-eastern portio of Tierra del Fuego, are low in stature, ill-looking, and badly proportioned. Their olour is that of very old mahogany, or rather between dark copper and bronze. The trunk of the body is large in proportion to their cramped and rather crooked limbs. Their rough, coarse, and extremely dirty black hair half hides, yet heightens a villainous expression of the worst description of savage features.

The Yacana-kunny, natives of the north-eastern portion of Tierra del Fuego, resemble the Patagonians in colour, stature, and, excepting boots, in clothing. They seem to be now much in the condition in which the Patagonians must have been before they had horses. With their dogs, with bows and arrows, balls* (*bolas*), slings, lances, and clubs, they kill guanacoes, ostriches, birds, and seals.

The names of Patagonia and Tierra del Fuego were given by Magalhaens; the first probably, from "patagones," meaning very large feet, referring to the Indians; and the second from the numerous fires seen upon that land at night.

For a lengthened and very interesting account of these people, the reader is referred to Captain FitzRoy's work, "Voyages of the *Adventure* and *Beagle*," Vol. II., chaps. vii., viii., and ix.

DESCRIPTION OF THE COAST.

On the northern shore of the Plata there is a springling of hills of a gigantic structure, scattered amidst extensive plains; while, on the South, or right bank, there is neither a hill, rock, nor even a stone. So low is the land between Point Piedras and Cape San Antonio, that around the great bay of Sanborombon it is extremely difficult to say where the water ends, or the coast line begins. Each difference, of even a foot, in the height of the water, makes a change of cables' lengths, if not of miles, in the position of the limiting line between water and land. In consequence, it is very dangerous for ships to approach that shore; and although the bottom is in many places soft, often extremely deep mud, there are other spaces in which hard lumps of tosca† are found, almost as injurious to a ship's bottom as actual rock. Admiral FitzRoy continues, "I am not aware that there is any granite on the South side of the River Plata near the shore; and although the name 'Piedras' would incline one to suppose there are rocks or stones near it, I could only find *tosca*."

Point Piedras, as before stated, is low, ill defined, and very difficult of recognition. A few stunted trees are visible at a small distance from the shore. This point should be approached with the utmost caution.

The *Piedras Bank*, a dangerous shoal, extends 7 miles to the East, and 15 miles southward of the point. It consists of sand and "tosca," as above stated, in its northern part. Within its limits the lead cannot be trusted, the bottom being nearer.

CAPE SAN ANTONIO, the southern point of Sanborombon Bay, is a name applied in the old charts to a space of 30 miles in extent. To avoid confusion, the northern part of this was called *Rosa Point*, and the southern Point Medanos.

From *Cape San Antonio*, in lat. 39° 19¼′ S., long. 56° 42½′ W., to rather more than half-way towards Cape Corrientes, the sea coast is sandy and low. Behind the beach are sand-hills, and farther inshore are thickets, affording shelter to numbers of jaguars. "In sailing along," continues Admiral FitzRoy, "even with both leads going, we were, for a few minutes, in imminent danger of grounding upon a bank, or ledge, which extends 6 miles E.S.E. from *Point Medanos*. The water shoaled so suddenly, and so irregularly, that I could not tell which way to steer; and as we had been running directly before the wind, it was impossible to retreat by the safest track (that which we had made in approaching). However, by persevering in pushing eastward away from the land, steering one way or another as the water deepened, we at last got clear. We then stood out to gain an offing, rounded the bank, and hauled close inshore again, nearly opposite to a large salt lagoon, called *Mar-chiquito*, which approaches the sea so closely as to have occasioned an idea that, by cutting through the narrow strip of land which separates them, a fine port might be formed.

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* *Bolas*, Spanish. Two or three balls, connected by a thong of hide, which they throw at animals or men, to entangle or disable them.

† *Tosca* is a kind of hardened earth, rather than soft stone, about the consistence of slightly baked clay: it is of a dark brown colour, and varies in hardness from that which is almost stony, to the texture of a sound old cheese.

"In the vicinity of Mar-chiquito, the country (campo) is very fertile and well watered. Sheltered to the South by a range of down-like hills, whence numerous brooks originate, it gives abundant pasturage to many thousands of cattle, and is considered by the Buenos Ayreans to be the finest district of their territory. This range of hills extends in a W.N.W. direction for more than 50 leagues, and varies in name at different places. That part next to Cape Corrientes is called Sierra Vuulcan (an Indian word, which means 'opening' or 'having openings'); 20 leagues inland is the ridge named Tandil: and at the western extreme is a height called Cayru. Between Tandil and Cayru there are many hills known by particular names, but they are all part of the range above mentioned; and it is a remarkable fact, that not only this range, that nearer to Buenos Ayres called Cerrillada, and that of which the Sierra Ventana forms a part, extend nearly in an E.S.E. and W.N.W. direction; but that most of the ranges of high land, most of the rivers, and the greater number of inlets, between Plata and Cape Horn, have a similar direction, not varying from it above one point, or at most two points, of the compass.* After we became aware of this peculiarity, it was far easier to avoid shoals, as they all lay in a similar direction.

CAPE CORRIENTES is a bold, cliffy promontory; off which, notwithstanding the name, I could not distinguish any remarkable current. It is said to be hazardous for a boat to go along shore, near the high cliffs of that Cape, because there are rocks under water which sometimes cause sudden and extremely dangerous "blind breakers:" more than one boat's crew has been lost there, in pursuit of seals, which are numerous among the rocks and caves at the foot of those cliffs. Hence to Bahia Blanca is a long and dreary line of coast, without an opening fit to receive the smallest sailing vessel, without a remarkable feature, and without a river whose mouth is not fordable. Even the plan of it, on paper, has such a regular figure, that an eye accustomed to charts may doubt its accuracy; so rarely does the outline of an exposed sea coast extend so far without a break. A heavy swell always sets upon it; there is no safe anchorage near the shore; and, as if to complete its uninviting qualities, in the interior, but verging on this shore, is a desert tract, avoided even by the Indians, and called, in their language, Huecuvumapu (Country of the Devil). In exploring this exposed coast, southerly winds sometimes obliged us to struggle for an offing; and we lost several anchors in consequence of letting them go upon ground, which we thought was hard sand lying over clay, but which turned out to be tosca, slightly covered with sand, and full of holes. The lead indicated a sandy, though hard, bottom; but we found it everywhere so perforated, and so tough, that, drop an anchor where we might, it was sure to hook a rock-like lump of tosca, which sometimes was torn away, but at others broke the anchor.

"Along this extent of sea coast, halfway between the currents in the vicinity of the Plata, and those occasioned by strong tides near Blanco Bay and the River Negro, we found no current. Whether there was a rise of tide, it was not easy to ascertain by the lead line, when at anchor, from the bottom being so uneven; and to land was impossible, on account of a furious surf. Anchorage is not a word I should use in this case (where the anchor was only let go for a short time, while the ship's position could be fixed with accuracy, and our triangulation carried on in a satisfactory manner), as it might deceive a stranger to the coast; stopping place would be better."

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* So constantly did Mr. Harris, who piloted the vessel, give this course (W.N.W.) on subsequent occasions, that it became quite a joke; but it is nevertheless a strong corroboration of what I stated respecting the general direction of the inlets, and ridges or ranges of hills.—*Adm. FitzRoy.*

There is a bare sandy spot on the East side of *Cape Corrientes*, around the upper part of which the green turf has a regular appearance, as if artificially cut. *Mogotes Point* is 5 miles South of Cape Corrientes, and takes its name (corn-stacks) from several peaked sand-hills like corn-stacks. *Andres Head*, the next point, is the S.W. extremity of a range of high, bold cliffs; beyond it the shore is low, sandy, and rocky. The bay between it and Mogotes Head should not be entered by ship or boat, as it has many sunken rocks, causing blind breakers, above alluded to. From Andres Head to *Hermeneg Point* the coast is rugged, and from 30 to 80 feet high, and has neither shelter nor anchorage for a ship. Hence to *Asuncion Point* and *Mount Hermoso* the coast has a similar appearance, and is equally unfit to approach. *Asuncion Point*, a projecting sandhill, 120 feet high, is difficult to distinguish, even on this unvarying coast.

BAHIA BLANCA lies at the western extremity of the coast just described. Captain (afterwards Admiral) FitzRoy here found the water much discoloured. *Mount Hermoso*, a little hill, is about 140 feet above the sea. It lies near the head of the bay; on this low coast it is somewhat remarkable, as being the only peaked hill close to the water; and having under it a low, cliffy point, the only one thereabouts. Near it is a roadstead, at the head of Blanca Bay, close to the entrance of Port Belgrano, but divided from it by a bank.

The Sierra Ventana, a high mountain, 3,500 feet above the sea, and still more remarkable from its lying in this low country, is to the northward of the Bahia Blanca. It is called by the country people (Gauchos) Monte Hermoso, or beautiful, from its fine and striking appearance, but the term is now restricted to the little mount before mentioned. A good bearing (astronomical, if possible) of the Sierra Ventana, and the latitude of the ship, will fix her position with certainty.

The deep bight formed by the sudden change in the direction of the coast on each side of Bahia Blanca is called the RINCON (corner). Generally speaking, it is shallow. Throughout the space, within the depth of 20 fathoms, there is anchorage with North and West winds, which are the most prevalent. In the Rincon, and along the coast to the eastward, the bottom is invariably sand, or sand mixed with broken shells or gravel, but its quality is very different in different situations, and requires great attention, whether for anchoring or for avoiding the numerous and very dangerous sandbanks. On and near the banks the sand is always of a dark brown colour, very fine; and generally unmixed with other substances, except sometimes bits of shells. On this ground the recovery of an anchor is always very doubtful, as most of the banks are of tosca, covered by this dark brown sand or pulverized tosca. In the offing, over very soft ground, the sand is speckled, or black and white, rather fine generally; when coarse, it is mixed with gravel; broken shells are also frequent. With these last soundings the seaman may be certain that he is out of danger from a shoal, and that he may drop an anchor with confidence.

PORT BELGRANO is at the head of Blanca Bay, and is the first harbour after quitting the Rio de la Plata. It is an excellent and extensive harbour; the channel to it, in a W.N.W. direction, is deep enough for any ship, and a soft muddy bottom. The land around is exceedingly low, and the ground is covered with saline deposits. From the land being so low, the water being intersected by banks, and having so few marks, it is very difficult of access; and no place can offer less that is agreeable to the eye, especially when the tide is out, and much of the banks show above water. A succession of similar inlets, indenting a half-drowned coast, extend hence, almost to the Rio Negro; and although the dangers are numerous, tides strong, banks muddy, and the shores everywhere low, the intervening ports are safe and likely to be useful. They are *Falsa Bay*, *Green Bay*, *Brightman Inlet*, *Union Bay*, and *San Blas Inlet*. The climate of Port Belgrano is delightful, and healthy to the utmost degree, notwithstanding such extensive flats, half covered with water, and so many large mud banks. Perhaps the tides, which rise from 8 to 12 feet, and run 2 or 3 knots an hour, tend to purify the air: indeed, as the whole inlet is of salt water, there may be no cause for such effects, as would be expected in similar situations near fresh water.

Argentina, the Buenos Ayrean settlement and fort, lies some distance beyond Port Belgrano, in the midst of a level country, watered by several brooks, and much of it thickly covered with a kind of trefoil. It was commenced in 1828, as an advanced post, and has not made much progress since. The most serious objection to the locality, as an agricultural, or even as a mere grazing district, is the want of rain. Two or three years sometimes pass without more than a slight shower. Good fresh water may generally be obtained, independent of the few running streams, by digging wells between 4 and 10 feet deep. There is but little firewood. Deer and other game are numerous, and fish swarm in the creeks. Fresh beef may be procured at the fort.

Falsa Bay is an extensive and dreary waste. Sandbanks surround it, and neither land nor landmarks can be seen until a vessel is within the banks, and then they are not wanted. The same remarks, as to the banks and the passages between them, apply here as to Bahia Blanca, and to Green Bay and Brightman Inlet. It is high water in Falsa Bay at 5^h 30^m.

To the South and West of Falsa Bay the *Laberinto Shoals* extend to the S.E. from Ariadne Island to lat. 39° 27′. They are nearly all under water; the outermost and most dangerous is the Paz Bank, of 4 feet water. As the land is in sight, it is not difficult to avoid it in daylight. *Laberinto or Labyrinth Head* is a perpendicular bluff, 40 feet high, apparently the termination of the shore on the South side of Brightman Inlet.

Green Bay is beset with shoals within sight, though the entrance looks somewhat tempting. If necessary to enter, take low water, and keep close to Green Bank, and and anchor to the North of the narrow passage of the East end of Green Island, with the peaked hillocks bearing W. by S. The flood tide sets across the entrance, not into it. High water at 5^h 10^m, full and change. Tides rise at springs, 12 feet; at neaps, 8 feet.

A vessel approaching *Brightman Inlet*, with a view to anchoring, should not go to the northward of lat. 39° 30′. Still more South will be safer, as to the North of it is dangerous, while South it is quite free from outlying dangers. There is abundance of game on Green Island, and good water may be got by digging wells about 8 feet deep on Green Island. Fuel in abundance may be got on the main land.

The River Colorado will admit vessels not drawing more than 7 feet. The bar at the entrance, and the banks within, are constantly shifting. *Union Bay* will suit vessels drawing less than 17 feet. In smooth water and fair wind a line-of-battle ship might enter, but the depth of 15 or 16 feet is usually draught enough.

SAN BLAS BAY is no place for a ship to enter, unless under favourable circumstances of weather, wind, and tide. It is decidedly dangerous with a south-caster, because there is then a sea on the banks outside which confuses the pilot's eye, and prevents his distinguishing the proper channel; besides which, thick weather, if not rain, is the general accompaniment to that wind. In the middle of the entrance to San Blas Bay is a rock, with 8 feet least water on it, which is very dangerous. The extreme dryness of the place causes great injury to shipping, and something at the bottom acts chemically on the iron cables, and corrodes them in a surprisingly short time. An English oak-built ship was rendered unseaworthy by being moored for four months here, and the cables were reduced one-third in size.

Between San Blas and the River Negro the stream of tide begins to set northward at half flood, and continues to run in that direction until half ebb. Off Raza Point it is high water at noon, at full and change; tides rise 12 feet. Variation, 17° East.

RIO NEGRO.*—In coming from the eastward for Rio Negro, the navigator should endeavour to make the land in about the parallel of 40° 52′ S., long. 62° 15′, when he will first see Point Raza, which will be readily known by three remarkable hummocks. After approaching to within about 1 league of this point, he has to steer S.W. toward Rio Negro, taking care not to come into less than 6 or 8 fathoms of water, with a sandy bottom. The shore is a continuation of low sand-hills, interspersed with heath and brushwood, until you approach the river, where the hillocks become more elevated, and are composed of clear white sand, lying in ridges or undulations like the waves of the ocean.

The mouth of the Rio Negro is situated in 41° 4′ S., and 62° 44′ W. The river is supposed to rise at the foot of the Andes, whence it runs generally in an easterly direction towards the sea. Its width at the mouth is about 2 miles, but it rapidly narrows; and at the town of Carmen, only 16 miles from its embouchure, it is about 280 or 300 yards. It does not decrease much in width above the town for the next 20 miles; but it is entirely unfit for navigation, even for the smallest class of merchant vessels, beyond 4 miles above Carmen.

The river is full of small islands and banks, the latter generall of sand. The former, when at all elevated, which is rare, are valuable for agricultural purposes, as the soil upon them is rich, and the proximity of water renders it moister than along the banks of the river and elsewhere. They are, however, generally flat, and are partially if not totally inundated every high tide. There are eight hours ebb and four hours flood tide. The current down the river is very strong.

Floods occur twice during the year; once in December or January, occasioned by the melting of the snow on the Andes; the other in June or July, caused by heavy rains in the interior. The summer floods, when very strong, do much injury to the cattle and crops along the banks. They are, however, usually considered by the inhabitants, especially if they occur early in lhe season, to be of great importance and benefit, as they bring the only water they can depend upon to moisten the parched land, and render it fit for cultivation.

The Rio Negro is a bar river. The bar is situated about 4½ miles from the entrance, and is exceedingly dangerous to vessels passing over it. There are as many as six channels by which the water of the river discharges itself into the sea. Three of them have sufficient depth to allow vessels drawing 11 feet of water to pass safely over; and one has water for vessels drawing only 9 feet; the two others are of little depth, and are continually shifting.

Vessels drawing as much as 12½ feet have occasionally passed and repassed the bar, but it is considered highly dangerous, and can only be accomplished at peculiarly favourable periods; but no vessel drawing more than 11 feet of water should attempt to enter the river, and not then unless there is a local pilot on board.

It is necessary to be remembered, that though vessels drawing as much as 14 feet would be able to cross the bar and enter the river, after a succession of south-easterly or easterly gales, yet the wind necessary to enable you to leave it would have an opposite effect, and would lessen the depth considerably; therefore, if a vessel drawing much water should ever be taken into the river, it is a great chance if ever she leaves it again.

The bar and the numerous sands at the mouth of the river are composed of quicksand, and their position is continually shifting; therefore no plan, however accurately surveyed, can be depended upon for more than a few months. The local pilot has two landmarks fixed on the North bank at the entrance of the river, to assist him in bringing vessels through the channels. He informed me that he is obliged to change their position frequently, especially after a severe gale or heavy floods.

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* For an Account of a Voyage to explore the River Negro from its mouth to its supposed sources, see Journal of the Royal Geographical Society, Vol. VI., p. 136.

Many places that were dry land a few years since are now covered with water, and *vice versâ*. I was told that soon after the first settlement was formed, a lighthouse was built on the North bank of the river; its site is entirely covered by the sea.

There are many flat shoals and banks in the river between the mouth and the town of Carmen; they are composed of sand; and in some places, on the North side of the river, of sandstone, rendering the navigation of the river dangerous to strangers. There is, however, a local pilot paid by the Buenos Ayrean government. This person has orders to board a vessel before crossing the bar. Previous to the appointment of any regular pilot, many vessels were lost on the bar and in the river; indeed, its banks and the whole coast for miles on each side of the mouth are strewed with wrecks.

The town of CARMEN, on the North bank of the Rio Negro, 16 miles from its mouth, is in lat. 40° 48′ S., long. 62° 55′ W. It was formed in 1779 by Viedma, a Spanish officer; and at present contains 1,230 inhabitants, including the soldiery. The town is irregularly and badly built, on the side of a steep standstone bank, about 50 feet high. The most prominent object is the ruined mud fort, erected by Viedma at the formation of the settlement. There were some good stone and brick houses on the East side, but these are now buried in the drifting sand, the roofs alone being visible. Its principal export is wheat, the whole of which is sent to Buenos Ayres. Horses and sheep are plentiful.

It is high water at the bar, on the days of new and full moon, at $11^h\ 15^m$; and the water there rises 11 feet on the spring tides, and 8 feet on the neaps; but when the wind blows strongly from the S.E. the tide rises from 12 to 14 feet.

Along the coast is a regular tide of 6 hours flood and 6 hours ebb; but the flood tide inclines rather towards the shore, about N.E. by N., at the rate of 2 or 3 miles an hour. Consequently, in entering the Rio Negro, particular attention must be paid to the currents and tides, which set strongly to the N.E. round the Point de Maine, or outer point.

The Rio Negro separates the Provinces of La Plata from Patagonia.

GULF OF SAN MATIAS, OR ST. MATTHIAS BAY.—From Rio Negro the coast trends westerly, for about 32 leagues, whence it sweeps south-easterly in a broad semicircle, terminating in a peninsula, which projects to the N.E., thus forming the extensive Gulf of San Matias.

The north-eastern side of the gulf is formed by the South Barranca range of hills, which extend from the Rio Negro to Belen Bluff, being highest (about 300 feet) near Belen Bluff. Thence nearly to Bermeja Head, the lowland above and inshore of the cliffs is extremely level. Near *Bermeja Head* (sometimes, but erroneously, called Cape Two Sisters) there are hummocks and irregular hills nearly covered with rough verdure. At the N.E. part of these considerable heights are two small peaks standing over two peculiar cliffs. Off all this coast, and in all other parts of San Matias Gulf, the sea is clear of all danger.

Port San Antonio, at the head of the Gulf, is the best place on the coast for a large ship in want of repair, although in a bad or out-of-the-way situation. In *Escondido Creek* the keel of a line of battle ship may be examined, the rise of tide being 24 to 32 feet. No fresh provisions, except game and fish, can now be procured. In approaching Port San Antonio from the south-eastward, Direction Hill and the Fort will be first seen; if from the South, the fort is seen soonest, a more singular resemblance to a regular fortification it would be difficult to form. *Direction Hill* is 560 feet high, and three small hummocks close together are seen on its summit.

The entrance to the port is much exposed to S.E. winds; at such times it would be imprudent to approach it without a probability of speedily entering it, as you would be embayed, ahd have to contend with a heavy, rolling sea. On each side of the entrance is a bank partly dry at low water, and very steep at the edges. For entering, keep Direction Hill W.N.W. until the fort bears S. by W., when you will see the hummock on Villarino Point bearing N. by S., and the Nipple Hill (a hill

600 feet high, on the range of down-like heights North of the port) showing over it on the same bearing. Having on these bearings, steer North, allowing for tide, so as to keep the Nipple just open to the West extremity of Villarino Point, which is low and sandy, with a few verdant hummocks on it, until you a half a mile from that part of the point, when you may go by the eye close to the East Bank, round the point to the berth most convenient. It is high water, full and change, at 10h 45m; the rise of the tide depends much on the wind, being generally between 3 and 5 fathoms.

The TIDE RACES near and in the Gulf of San Matias are remarkable. Admiral FitzRoy says: "On the 6th of May, 1833, while returning from San José to the River Negro, our little vessel got into a ripple, which did not break, but had almost the appearance of a whirlpool. There was a short hollow swell, and an irregular motion in every direction, exactly like the boiling of a pot on a great scale. Here again they would touch no bottom with 50 fathoms of line and a heavy lead. These races and ripplings in such deep water about the peninsula of San José are very remarkable; chiefly because there are none such on any other part of the coast."

On another occasion his little vessels (the *Paz* and *Liebre*) when off Port Valdez, on the eastern side of the peninsula, fell in with these "races."—"Towards noon the wind fell light, and the vessels were swept by a strong tide stream towards a 'race,' whose noise might have appalled the crews of much larger and stouter barks. No bottom could be struck with the deep-sea lead, and no efforts of the crew at the oars had much effect in arresting their progress toward apparent destruction." . . . . At 5h that afternoon they were 18 miles off shore, and out of soundings with their lead lines, and yet were only 1½ mile from the eastern part of the races. For two hours they passed through a rippling, but could strike no soundings with 60 fathoms of line.

The tide races are less formidable within the bay than off Point Norte, or outside.

Port San Josef is a barren and desolate place, without wood or fresh water, and too large for a harbour. On each side of the port are bold cliffs, headlands, with deep water to seaward; but a shoal ledge runs from one to the other under water. The tide stream rushes into and out of it in a violent manner, especially when opposed by wind; but after the narrow part of the entrance is passed, all agitation of the water ceases, except what may be caused by wind. That it is too large for a harbour, there was proof at the time of the *Beagle's* visit, for they found the wreck of a small vessel at the N.E. part of the port, which had been driven from her anchors and totally lost, though she was lying in a land-locked bay, or rather gulf. It is high water in the entrance, on full and change, at 10h; rise, 25 feet. Variation, 17° 45′ E.

From the East side of Port San Josef there is a continued cliff, from 60 to 100 feet high. No high land appears near the shore, all looks low, bare, and sunburnt. No danger lies under water, but the tide races off it, and to the eastward of Norte Point, are troublesome and dangerous. *Norte Point,* or *Lobos Point,* is lower than the adjacent cliffs, and a reef projects under water about a mile, so that it must not be approached within that distance; beyond it is drep water.

From Norte Point to Valdes Creek the land is low, mostly a shingle beach, and off this coast are the worst tide races, being occasioned by rocky patches lying from 2 to 10 miles off those S.E. of Norte Point.

Valdez Creek, a dangerously deceiving inlet of a singular character, may be known by the shingle beach ending, and by a line of cliffs commencing at Cantor Point on the South side, and extending to *Ercules Point,* a high white cliff. The entrance to Valdes Creek is narrow, and sometimes entirely closed up by shingle. From Cantor Point to Nuevo Head the upper part of the coast is nearly horizontal.

NUEVO GULF is easily known by the two well-defined headlands at its entrance: off Nuevo Head, the easternmost, no danger exists. It is steep-to, 200 feet high, and bold. *Ninfas Point,* the westernmost, is 240 feet high, and makes as a double point. It ought not to be approached within 2½ or 3 miles, on account of rocky ledges extending from it. In mid-channel you are out of the ripplings, and the tide is sufficiently strong to carry a vessel to windward, while hove-to, in a fresh gale. When once well inside the heads, the tide is much less strong, and there is no danger. The cliffs here and to the northward contain prodigious quantities of fossil shells.

Whale ships, having good ground tackling, may lie in any part of the bay in perfect safety. The best anchorage is on the West side, in from 5 to 10 fathoms, at about a mile off shore, as in this part easterly winds seldom, if ever, blow with sufficient violence to injure any ship lying with her anchor ahead.

The River Chupat, the mouth of which is in lat. 43° 20½′ S., was discovered by Lieut. Wickham in 1833. Its banks are much frequented by the wild cattle, large numbers of which were taken by the Spaniards. The shores are of a rich alluvial soil, covered with immense timber drifts. Some of the trees are large and sound, lying several hundred yards from the banks, showing that the periodical floods must be great. The river itself is free from drift timber, but is shoal and narrow, few places being deeper than 6 feet at low water, or wider than 100 yards. The stream ran down at 2 or 3 knots an hour. It is high water, at full and change, in the entrance, at $7^h\ 10^m$; rise, 13 feet.

PORT SANTA ELENA, in lat. 44° 30′, is a small bay, which was surveyed by the officers of the Spanish sloops *Descubierta* and *Atrevida* in 1794. It is quite open to the South; and near the middle of the entrance, which is only 1¾ mile wide, is a small shoal of 12 feet; and at 2 cables *true* East from it is a low islet, named *Florido.* The best passage in is to the West and N.W. of these, where there will be found 10 to 7 and 6 fathoms of water, in the N.W. cove of the harbour.

The bay, according to Mr. Weddell, affords good shelter from S. by E. westward to E. by S.; and as the heavy and prevailing winds are between these points, this place may well be recommended to stop at for a few days. The winds are seldom from S.E., and generally light; and the side running strong across the entrance to the bay, the sea, during strong S.E. winds, is much cut off.

Guanacoes are here very numerous, but not easily approached; they much resemble deer. Their flesh is well tasted, like well fed mutton; and they are large enough to make them an object of consideration to ships touching on the coast in want of refreshments. One was caught, which, when cleaned, weighed 120 lbs. The difficulty of procuring these animals, from their fleetness and watchfulness, is such, however, that they cannot be taken hastily, but must be entrapped by lurking behind bushes about their watering places at the dawn of the morning. Hares, which are also numerous here, are much larger than in other countries. High water, full and change, at $3^h\ 45^m$, or 4^h; vertical rise, about 20 feet.

Capt. King says that this harbour may be easily known by some hummocky hills on the N.E. projecting point, upon the easternmost of which is a remarkable stone, that appears to have been placed there as a monumental record, but which is a natural production. The best anchorage is at the N.W. corner of the bay, in 6 or 7 fathoms, but not too near the shore; for when the sea is heavy, the ground swell breaks to some distance off. In working into the bay, the 2-fathom bank must be avoided, for which the Islet Florido is a good mark.

There are two wells on the N.W. side of the harbour, but the water is too brackish to be of any value, nor is fresh water obtainable here. Of fuel a temporary supply may be procured from a low shrubby tree, which is moderately abundant.* Besides guanacoes, ostriches, armadilloes, and the cavia, or Patagonian hare, are to be procured, as are also wild ducks, partridges, snipes, and rails; but fish seem to be scarce. The Indians sometimes visit this place, principally for burying their dead.

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* The wood, although of very small size, burns well, and is much prized by sealers for that quality. The tree bears a yellow flower, with a prickle at the extremity of every leaf. The sealers call it *picolo*, from the small dimensions of the stem. The roots also are dug up and used for fuel.—*Captain King.*

"Seamen should remember that a knowledge of the tide is of especial consequence in and near Port Santa Elena. During a calm, we were carried by it towards the reefs which line the shore, and were obliged to anchor until a breeze sprung up.

"The coast along which we had passed, from Point Lobos to the N.E. point of Port Santa Elena, appeared to be dry and bare of vegetation. There were no trees; the land seemed to be one long extent of undulating plain, beyond which were high flat-topped hills, of a rocky, precipitous character. The shore was fronted by rocky reefs, 2 or 3 miles from high-water mark, which, as the tide fell, were left dry, and in many places were covered with seals."—*Captain King.*

Cape Raso is 4 leagues to the northward of Port Santa Elena. On the coast between are numerous rocks, described by Captain King, one of which is nearly 5 miles from shore. An approach is therefore to be avoided, more especially as the tide sets along with some degree of strength. Great caution is therefore requisite, as the water is deep, and if becalmed, it may be necessary to anchor, which will be at least in 30 fathoms of water.

Cape Dos Bahias, or Two Bays is about 7½ leagues to the southward of Port Santa Elena. It is a rounded point; a hill close to the sea, on the most projecting part of the Cape, being in lat. 44° 58′; a small islet, *Arcé*, to the S.E. of the Cape, in 45° 0′ 50″; and an islet, *Rasa*, in lat. 45° 6′ 30″, long. 65° 20′ 45″. From Cape Two Bays the coast trends westerly, and forms the northern side of the great Bay of St. George, the southern limit of which is Cape Three Points, in lat. 47° 10′.

Port Malaspina, in or about lat. 45° 12′, long. 66° 39′, is fronted by the Viana Islets or Rocks, behind which vessels may find shelter from every wind, the S.E. excepted. In approaching this small bay, you will see the *Tetas* or *Paps of Pineda* to the North, abreast of which you may anchor in from 10 to 6 fathoms of water, fine sandy ground. Port Malaspina is a mere rocky inlet, unfit for anything except a boat.

There are many other good anchoring places between this and Cape Blanco, the southern extremity of St. George's Bay, which require no particular directions, as the coast is bold and clear of danger within half a mile of the shore. Easterly winds never blow here with any degree of violence; so that whalemen may cruise about these shores in the calving season with the greatest safety.

CAPE TRES PUNTAS, or Three Points, is very easily discerned, and may be known by its very level outline, being a long range of table land, higher than any part near it, visible from the deck for more than 20 miles; and to the S.E., detached, but near the range there is a conical hill, which is readily discerned from the northward, but from the N.E. is not seen, being concealed by the ranges of land behind it in the S.W.

Cape Blanco, in lat. 47° 15′, is 6½ miles to the south-eastward of Cape Three Points. It is a low, rugged tongue of land, terminated by a rounded but very rugged hillock, and two smaller ones, which, when first seen, appear to be islands detached from the coast. The neck of land which forms the communication with the coast is low and sandy, and probably offers, on its South side, shelter from southerly winds.

There are several shoals off this part of the coast, which have not been thoroughly examined, but are supposed to be dangerous: they seem to have been thrown up by the force of the tide, which sweeps round the Cape, into and out of St. George's Bay, with great strength. The North and South ends of the northern shoal bear, respectively, from Cape Three Points and Cape Blanco, E.N.E. ¾ E. [*East*], distant from the former 7 miles, and from the latter 5 miles; consequently it extends N. 33° W. (by compass) 5½ miles, but is scarcely one-quarter of a mile wide.

The North end of the southern shore bears E. 3° N. [*S. 75° E.*] 7 miles from

Cape Blanco, and extends in nearly a *true* South direction for 2 miles. Between these shoals is a passage 2 miles wide, and the depth gradually increases to more than 15 fathoms.

Within the outer shoals are two others, imperfectly known; and there is said to be much shoal ground to the N.E. At 14 miles N. 35° E. from Cape Three Points, in 1829, the depth decreased rather suddenly from 40 to 14 fathoms, pebbly bottom, and the edge of the bank was found to be about 8 or 13 miles within the soundings of 50 fathoms. On approaching, the quality of the bottom becomes irregular, and changes from oaze to sand, and the shoal patches are pebbly; so that by attention to the soundings and nature of the bottom, these shoals may be easily avoided. A good mark for the same purpose is, not to approach so near to the Cape as to see the rugged hillock of Cape Blanco; and to keep the high land of Cape Three Points on the horizon; this land being visible from the deck at 20 miles off.

The flood, or northerly tide, ceases in the offing at $4^h\ 15^m$ after the moon's passage; but in the neighbourhood of the Cape, and among the shoals, are strong ripplings, which set with considerable strength.

Off the coast southward, between Cape Blanco and Port Desire, within the distance of 3 to 5 miles from shore, are several small patches of rock, which uncover at half tide; but beyond that belt the coast is free from any known danger, and may be approached by sounding in not less than 14 or 15 fathoms; within that limit the ground is foul.

PORT DESIRE, latitude 47° 45′.—To the northward of Port Desire the land is low, with a shingle beach, excepting for the first 3 miles, where it is high and cliffy. The North point of the entrance is a steep bluff, which is remarkable as being the only point of that description along the coast to the northward. At 3 miles N. 28° E. from this bluff is a ledge of rocks, *Surrel's Ledge*, at a quarter of a mile without which the depth is 13 fathoms. The *Tower or Steeple Rock* becomes visible after passing this ledge, and opens out when the North bluff bears S.W. ½ W. A ship bound to Port Desire, or requiring anchorage in the bay which fronts it, may find a good berth in 6¾ fathoms, well sheltered from N. ¾ W. to S.E. ¼ E., with the North bluff bearing N.W. ¼ W., the Tower Rock W. ¾ N., and Penguin Isle S.E. ¼ E.

This situation being a little to the southward of the fairway of the port, and about 1¼ mile from the nearest shore, is quite out of the strength of the tide; the bottom, being strewed with rounded stones, is rather foul for hempen cables; but the holding ground, although of suspicious quality, seemed to be good. At this place the vertical rise of tide was found to be 18¾ feet. High water, full and change, $12^h\ 10^m$.

The *Beagle Bock* lies not far from mid-channel, just without the entrance to Port Desire. The *Beagle* struck on it at night in 1829, and could not afterwards find it, until Captain FitzRoy struck on it in January, 1834, in leaving the port, with the last quarter ebb. At low water there is but 8 feet water on it.

Port Desire was so called by Sir Thomas Cavendish, who put into it in November, 1586. The rock, called the Tower Rock, rises like a steeple out of the water; it is like an enormous dead tree with its branches lopped off, about 40 feet high, having its upper portion cleft as it were for about one-third down the middle. Commodore Byron, on his voyage in 1764-6, anchored off the harbour in 9 fathoms, and sent boats to examine within, when many shoals and rocks were found, with a tide exceedingly rapid. Captain King says that the river has rather a difficult entrance, from the strength of the tide, and its narrow width, and it is rendered still more confined from several rocky reefs that extend from the North shore to nearly mid-channel. There is good anchorage off the mouth. By waiting, therefore, for low water, all the dangers that exist will be seen, and the vessel easily dropt in with the tide, should the wind be, as it generally is, westerly. If it be fair, it is advisable for the ship to be in the entrance at slack water; or, if the breeze be strong enough, a little before: as the water is deep on the South shore, there seems to be no real danger that may not be avoided by a careful look-out for kelp, which always grows upon, and therefore plainly indicates, the existence of rocky ground. The course in is about W.S.W. ¼

W., and the distance from the entrance to the anchorage is 1¼ mile. The latter is off the ruins on the North shore,* and the vessel should be moored. The tide sets in and out regularly.

The river was examined for 16 miles, but is probably navigable to a much greater distance. Four miles above the ruins there is a small peninsula, connected by a narrow isthmus to the North shore. By sending a party up, and stationing men with guns on the isthmus, it is very likely that several guanacoes may be shot as they are driven across it; for the peninsula is their favourite place to feed upon. These animals are very abundant, but unless stratagem is used, they are very difficult, from their shyness, to be approached. There are some water holes near the ruins, which generally contain water, but of so brackish a quality as scarcely to be worth notice. The wood, of a small size, is of the same species as that of Port Santa Elena, described in the note, page 425.

Penguin Isle, lat. 47° 55'.—Of this little isle the outer side is bold, and may be passed very close without danger, for the stream rather sets off than toward the shore; but the tide hereabout is very rapid, and forms, even in a calm, strong ripplings, which in a breeze must be very dangerous for boats. The flood sets to the northward, and during its strength more than 3 knots; the ebb was found to have set 15 miles to the southward in five hours. Off the island the northerly stream ceases at about four hours, or four hours and a quarter after the moon's passage, which is three and a half, or four hours, at least, after high water on the shore.

SEA BEAR BAY, according to Captain King, one of the best anchorages on this coast, is in lat. 47° 56' 49", long. 65° 44½', but it is difficult of access without a leading and fresh wind, on account of the strength of the tides, which set to the northward, through the narrow channels separating the rocky islets that appear between Penguin Island and the main land. The bottom besides is not only deep, 23 to 30 fathoms, but is very foul and rocky; and although a ship may be prevented from drifting through by dropping an anchor, yet its loss, from the foulness of the ground, would be almost certain.

In entering the bay, border pretty close to the low rocky point to the southward, in order to avoid a reef that lies about a quarter of a mile without it; but as the sea always breaks upon it, the eye and a due consideration to the tide are the best guides. The reef extends some distance to the eastward of the breakers, and therefore the tide, when within it, sets in or out of the bay, bnt with little strength.

No wood of any size is to be procured here, and scarcely any water. The passage to the watering holes is over a small rocky bar, which a boat may cross at three-quarters flood: it is immediately within the eastern point of the bay. There is a small spring at the North end of the third sandy beach, which a herd of guanacoes was observed to visit every morning; but as the water trickles down in a very small quantity only, it cannot afford more than a temporary supply. Two of the three wells at the point were found to be full of sea water, which had breached over the rocks; the other contained about forty gallons of rather a brackish taste.

Besides a good and secure anchorage, this place affords no other advantage, but it is convenient for sealing vessels while the people are employed upon Penguin Island. High water, full and change, at 12ʰ 45ᵐ; rise, 20 feet.

Spiring or Ferrer Bay is contained between the South head of Sea Bear Bay, and a point of land within *Ferrer Islet*, or the *Shag Rock*, which lies in lat. 48° 8' 25", long. 65° 53' 30". The bay is much exposed, being quite open to the South and East; and at the conclusion of a S.W. gale, when the wind always veers to South and S. by E., there is a considerable sea. The shore is skirted for some distance off with many rocks, and the bay altogether is quite unfit for anchorage. The height of the land is the same as that about Sea Bear Bay, but has more nodules or lumps of rocky hills on the outlines of its summits.

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* Some years since a Spanish colony was founded at Port Desire, but not answering the purpose, it was soon given up. The ruins of the edifices, which are of stone, and the remains of a fruit garden, that at our visit produced quinces and cherries, distinctly point out the spot.—*Captain King.*

The *Ferrer*, or *Shag Rock*, is a whitish mass, perfectly bare, at about 1¼ mile from shore; at 2 miles to the S.S.E. of it are four small dark-coloured rocks, and at 3 miles South from it is a rocky islet. On the land, and at a short distance from the coast, are three hills, which appear, when a little to the southward of Sea Bear Bay, like three round topped hills, but on reaching more to the southward they appear to extend in length, and form into two hills; and at 3 leagues to the southward of the Shag Rock they look like one mass of table land.

The **Sirius Rock** was discovered by the ship of the name striking on it on March 10, 1849. It is about 10 miles E.N.E. of the South point of Spiring Bay.

Watchman Cape, the *C. de los Desvelos* of the Spanish navigators, is situate near lat. 48° 18′ 55″, long. 66° 18½′. It is very low, but may be known by a bell-shaped mount, which stands at about 2 miles from its extremity, and from the southward resembles, in shape and colour, Monte Video, in the Rio Plata, but is not so high. It is likewise called *Monte Video*, or *Redonda*. Its position is that given above.

At 2 leagues from the extremity of the cape is a shoal with kelp upon it, on which the least water is 3 fathoms, but on approaching it the depth gradually decreases; there are also many other shoal patches, but all are covered with seaweed. The *Adventure* passed several in 7 and 9 fathoms.

The ground is very foul and uneven for more than 4 miles from Watchman Cape, towards the Bellaco Rock, but not quite out to it. Hence the coast trends to the westward, and becomes higher.

The Bellaco Rock, or *San Estevan's Shoal*, which was discovered by the *Nodales* in 1619, was again found by Captain Stokes in 1828, on his passage down the coast, and its position was then ascertained to be, lat. 48° 30′ 50″, long. 66° 10′. It bears S.E. by S., 10¼ miles from Watchman Cape, and S.E. from Monte Video. The rock appears like a dark mass, about 9 or 10 feet above the water at high tide, and in form of a boat turned bottom upward. Within half a mile of its South side the *Beagle* sounded in 12 and 15 fathoms, rocky bottom; and on its East side, at the same distance, the depth is from 20 to 24 fathoms. Capt. FitzRoy says, that there are at least two distinct masses of rock, and that a ship may pass between them. The larger, or eastern rock, is about 100 yards long and 80 yards wide, with kelp growing on most parts of it, which most likely will prevent the top wearing away, while so protected by seaweed. According to the tide (which rises 20 feet), it will appear nearly awash, or as high as the hull of a ship. The ground around it being foul and uneven, the coast in the vicinity should therefore be avoided.

And here it may be noticed that the whole of the coast between Cape Blanco, in lat. 47° 15′, and Port St. Julian in 49° 12′, is more or less strewed with shoals, which are the more dangerous from the strength of the tides setting between them. In navigating, generally, off the coast, the depths and quality of the soundings will be a guidance; observing that, when the depth exceeds 40 fathoms, there exists no known danger. By night, in particular, regard should be paid to the tide, which runs in considerable strength, parallel with the shore.

PORT ST. JULIAN.—*Cape Curioso*, on the North side of the entrance of Port St. Julian, is situate in lat. 49° 11′ 10″, long. 67° 35′. Between Watchman Cape and this port the land is of moderate height.

Wood's Mount, in lat. 49° 14′, long. 67° 44′, is visible from the deck for at least 11 leagues, and is a good mark for Port St. Julian, being flat-topped, 950 feet high, and much more elevated than the land about it. The trend of the land may also be a guide on approaching; but as the land about the port is higher than that either to the northward or southward, and as Wood's Mount is so remarkable, no mistake can be made. In a line with the South point of the entrance the mount bears W. 16° S.

[*N.* 86½° *W.*] The North head, Cape Curioso, is a low point jutting out to the northward; it is formed of cliffs horizontally stratified, of which the upper part is whited-brown, and the lower generally black, or black streaks.

Keeping Wood's Mount S. 67° W. will lead to the South Head; which will be easily distinguished when at the distance of 6 or 8 miles or more, according to the state of the weather.

The bar of this dreary port is shingle (or gravel), and often altered in form by south-east gales, or unusual tides. Under ordinary circumstances, the tide rises 30 feet at full moon.

The land to the southward of Port St. Julian is uniform, flat, and low; it is covered by scrubby bushes, and fronted by a shingle beach. At 10 or 12 miles South of it, on approaching from the E.S.E., a small flat-topped hill may be seen over the low hills on the coast.

In the parallel of 49° 27′ S. the character of the coast changes entirely to a range of steep white clay cliffs, the average height of which was calculated, by angular measurement, to be about 300 or 330 feet. They rise like a wall from the sea, which, at high water, nearly washes their base; but at low water they are fronted by a considerable extent of beach, partly of shingle and partly of mud. Some short rocky ledges, which break at half tide, lie off certain parts of this range, but none of the ledges extend for more than a mile from the shore. This cliffy range occasionally forms projections, but so slight as not to be perceived when passing abreast of them.

Anchorages along the coast may be taken up, with the wind off shore, at from a mile to 2 miles from the beach, in from 9 to 12 and 14 fathoms, oozy bottom. In lat. 45° 59′ the range of steep white cliffs begins gradually to diminish in height; and terminates at 9 miles further to the southward in a low point, *Punta Rasa*, which forms the North side of the entrance of *Port Santa Cruz.*

SANTA CRUZ,—having a mount at the entrance, on the South side, in lat. 50° 8′ 30″, long. 68° 19′ 45″. On the 24th of January, 1824, Mr. Weddell put into this place, for the purpose of converting some blubber into oil, &c., and he then made a sketch of the harbour, which is given in his Narrative. He observes that the entrance cannot be seen at any great distance, as the land which lies behind covers it; but by the latitude it may easily be found.

The shore on the left or South side is high, while that on the right is quite low. On the South side is a reef of rocks, which show at low water; and on the North side is a shoal, almost dry at low water, which probably shifts.

The leading mark into the river is a distant bluff, which appears over the middle of the entrance, bearing N.W. by W. ½ W. After passing the points of the entrance, two indentations will be seen on the South shore, and in the second one is the best anchorage, in 5 fathoms, bottom of gravel and clay. All the North side of the river is shoal, and much of it dries at low water. The tide flood on the coast runs to the northward, and in strong southerly winds continues to run two hours after the time of high water by the shore.

Captain King's description is more in detail, as follows:—

The appearance of the coast about the entrance of the River of Santa Cruz is very remarkable, and easy to be known from the manner in which it makes when seen from the northward; and is even more conspicuous when seen from the southward. From the latter direction a coast line of cliffs and downs, of considerable height, is seen extending to the southward of the entrance, as far as the eye can reach, and terminating abruptly to the northward in a high, steep, flat-topped cliff, *Mount Entrance*, of which the upper part descends vertically, the lower slopes off, and appears to be united with some very low land, which may be seen extending (according to the distance off) two or three points of the compass to the northward of it. Mount Entrance is situate as already shown, and is, by angular measurement, 356 feet in height.

The outer part of the bar, on which, at low tide, there are 14 feet water, is nearly 4 miles E. ¾ S. (*by compass*) from Mount Entrance.

Weddell's Bluff, the headland already noticed as the leading mark, is 14 miles up the river, on the South bank; and 11 miles farther up is another, now called *Beagle Bluff*. With Weddell's Bluff N.W. by W. ½ W., the *Beagle* crossed the bar in 7½ fathoms. The Beagle Bluff, a little open of the low points of the North side of the river, is also a leading mark for crossing the Bar.

After crossing the Bar, which is about a mile broad, a small island in the harbour, *Sea Lion Island*, will be seen. Here there is no impediment to a free course upward, keeping midway between the narrow points of the entrance, until reaching shoals which project from the S.E. end of Sea Lion Island. The best anchorage appears to be to the southward of that island, in 5 and 5½ fathoms, bottom of clay, covered with gravel, and out of the strength of the tide.

The shore on the S.W. side of the harbour is a range of clay cliffs, of the average height of 250 feet, with grassy downs, and intersected with valleys and ravines. On the eastern side the land, for the most part, is low and level, with a shingle beach; the aspect of the country is dreary, the soil gravelly, and the vegetation scanty; the largest vegetable production being bushes bearing berries, none of which exceed 7 or 8 feet in height. Many brant geese and ducks were seen, as well as the common sea fowl of these parts, such as penguins, cormorants, gulls, ducks, and divers. Several ostriches were seen on the beach, and traces of guanacoes were observed.*

At an anchorage outside the bar, Mount Entrance bearing nearly W. by S., and Weddell's Bluff W. ½ N., the *Beagle* road out a gale from the S.S.W. and S., with a heavy sea, without driving.

Into the entrance of the Santa Cruz the flood tide sets about 4 knots an hour; one may say, from 2 to 5 knots, according to the time of tide, and the narrower or broader part of the opening; and outwards, the water rushes at least 6 knots on an average in mid-channel.

There are places in which at times, when acted upon by wind or an unusual flood, it runs with a velocity of not less than 7 or 8 knots an hour, perhaps even more; but near either shore, and in bights between projecting points, of course the strength of the outward as well as inward current is very inferior. At high water a noble river, unimpeded, moves gently, or is scarcely in motion; at other times, with 40 feet change in the level of the water, a rushing torrent struggles amongst numerous banks, whose dark colour and dismal appearance add to the effect of the turbid yellow water, and naked looking muddy shores, covered with hosts of crabs.

These great torrents and tides have embarrassed the mouth of the Santa Cruz with a number of banks. They are all composed of shingle and mud, and alter their forms and positions when affected by river floods, or by the heavy seas caused by S.E. gales.

The tides in the offing were observed to flow very regularly six hours each way, but to turn two hours later than the time of high water inshore; the flood setting to the northward.

In the river the ebb tide runs for 7 hours, and is beaten back for 5 hours. It is high water, at full and change, at 9h 45m. Springs rise 42 feet; neaps, 18 feet. Variation, 20° 54′ E.

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* For a description of the interior rivers, &c., see Captain King's Directions, pp. 11, 12; and for an account of an exploration of the upper course of the river, see "Voyages of the *Adventure* and *Beagle*," Vol. II. p. 36.

This port was discovered in 1520, by Don Juan Serrano, captain of the *S. Iago*, who accompanied Magalhaens in his voyage around the world. The ship was wrecked in this river, but the crew were saved.

To the South of the river the coast is bounded by a ledge of rocks, which are either uncovered at half tide, or indicated by a line of breakers: these extend as far as 3 miles off.

COY INLET, in lat. 50° 57′.—Between Santa Cruz and this inlet the coast trends slightly inward, and is formed by a succession of cliffs and intervening low beaches. The inlet is conspicuous, as it is the only part of the coast that appears as such between Santa Cruz and Cape Fairweather, in lat. 51° 32′, long. 68° 55′ 50″.

When within 7 miles of the parallel of the inlet, as well to the northward as to the southward, a ship should keep at the distance of 4 or 5 miles from the coast. There can be no inducement to go nearer, as this place affords neither fuel nor water; and if incautiously approached, much trouble and danger may ensue from ledges of rocks, which exist at 3 miles, if not more, from the coast.

From Coy Inlet to Cape Fairweather the coast is similar to the former part, but more free from rocky ledges; and good anchorage may be found at from 2 to 6 miles off shore, in from 7 to 12 and 14 fathoms, muddy bottom; the water shoaling gradually to the shore. The beach is of shingle to high water mark, and then of hard clay as far as 100 feet beyond the low water limit, where a green muddy bottom commences, and the water gradually deepens. The outer edge of the clay is bounded by a ledge of rocks, on which the sea breaks, extending outward for some distance parallel with the coast.

Hereabout the flood sets to the N.W. by N., and the ebb S.E. by S., six hours each way; high water, at full and change, between 9h and 10h. Vertical rise, 24 feet.

At about 17 miles North of Cape Fairweather, in lat. 51° 16′, is a ravine with a copious supply of fresh water, obtainable without difficulty with the wind off shore. It is much grown over with plants, and may not keep, though serviceable for a temporary supply.

CAPE FAIRWEATHER is the southern extremity of the long range of clay cliffs extending from Coy Inlet, and almost without a break. The cape resembles very much Cape St. Vincent, on the coast of Spain; it also bears a strong resemblance to the Virgins' Cape, to the southward, for which it has frequently been mistaken, although there is a difference of more than 45 miles in the latitude of the two headlands. The cliffs are of white soft clay, from 300 to 400 feet high, and are horizontally stratified; the strata extending for many miles without interruption, and having the appearance of "chalk hills, like the coast of Kent."

The interior presents open plains of undulating country, covered with grass and plants, among which is abundance of wild thyme, but entirely destitute of trees; it abounds with guanacoes, which may be procured by lying in wait at the water holes. Fresh water may be seen trickling down the face of the cliffs at short intervals.

RIVER GALLEGOS.—Cape Fairweather, in the position indicated above, forms the North side of the entrance of the River Gallegos. The South side is a low shore, not visible more than 4 or 5 leagues off; but there are in the interior several hills, called the *Friars* (los Frayles), the *Convents*, and the *North Hill*. The river is fronted by extensive sand banks, most of which may be crossed at high water, but at half ebb they are almost dry. The channel is within the southern extremity of the shoals, which bears from the southern bend of the cape S.E. by E. ½ E. [*S.* 43½° *E.*] 10 miles. The passage in is parallel with the coast on the South side, taking care not to open the land to the northward of the easternmost bend of Cape Fairweather; which, when in the fairway, should bear N. 40° W. The shore on the port hand must then be gradually approached, and as the place is imperfectly known, it may be prudent to anchor in 10 fathoms, at 1½ mile from shore, in order to await low water, as soon as the South point is seen to trend round to the westward. Here the anchorage is good, and well sheltered from prevailing winds.

By anchoring thus the passage upward may be easily found, and may be passed before the shoals are again covered. Four fathoms is the depth at low water in the narrowest part of the channel. Anchorage must be taken up on the South side, for to the northward the banks are extensive.

There is, however, a middle channel, which appears to be the widest, and may be the best, for crossing the bar; but this has not been sufficiently examined. It seems to have a sufficient depth, at three-quarters flood, for any vessel to pass through it; but the southern channel is preferable, from having the land as a guide.

The river extends 30 miles to the westward, and then winds southerly between two ranges of hills. Its banks are formed of downs, abounding with guanacoes and ostriches. The water is fresh at 25 miles from the mouth. In the entrance the time of high water, full and change, is $8^{h}\ 50^{m}$. Vertical rise, 46 feet. Velocity, 5 miles an hour.

CAPE VIRGINS.—This cape is a steep cliff, about 300 feet high, in lat. 52° 18′ 35″, long. 68° 17′ 30″. It is the southern extremity of the Patagonian coast, and the North side of the entrance of the Strait of Magalhaen. From the South side of the River Gallegos the coast towards the Virgins' Cape trends in a south-easterly direction, and for the first half of the distance is so low and shelving as not to be visible at a few leagues off. The cape, as before stated, is much like Cape Fairweather. Captain King says: "At daylight the land was in sight, terminating in a point to the S.W., so exactly like the descriptions of Cape Virgins, and the view of it in Anson's voyage, that without considering our place on the chart, or calculating the previous twenty-four hours' run, it was taken for the cape itself; and no one, suspecting a mistake, thought of verifying the ship's position. The point, however, proved to be Cape Fairweather. It was not a little singular that the same mistake should have been made on board the *Beagle*, where the error was not discovered for three days. A similar error was made by one of the ships of the fleet, under Loyosa, in 1525."

The marks in clear weather, by which it may be known, are the Friars and other hills before mentioned; and in thick weather the soundings, on approaching, will be a certain guide; for at the distance of 4 miles off no more than 4 fathoms will be found, whereas at that distance from the Virgins' Cape the depth is much greater. It is also to be noted that the bottom to the North of Cape Fairweather is of mud, while that to the North of the Virgins' Cape is of gravel or coarse sand, and the latter has a long, low point of shingle extending from it nearly 5 miles S.W.; and lastly, if the weather be clear, the distant land of Tierra del Fuego will be visible to the S.S.W.

At 18 miles to the southward of Cape Fairweather cliffs commence, which extend thence to the Virgins' Cape, with the exception of one or two breaks only; in one of these, 8 miles North from the Virgins' Cape, there may be landing for a boat. There is good anchorage, generally, all along the coast, at from 2 to 5 miles off shore; but the bottom is rather stony, and may injure hempen cables. As the cape is approached the ground becomes more foul.

STRAIT OF MAGALHAENS.—At the distance of 5½ miles to the south-westward of the Virgins' Cape is a low, shingly point, now called *Dungeness;* and at 20 miles westward from Dungeness is the cliff, 300 feet in height, called *Cape Possession.* The last forms the eastern side of a shoal bay, which, under the name of *Possession Bay*, extends thence 7½ leagues to the westward, where the *First Narrow* of the strait commences. The latitude of the middle of Cape Possession, as given by Capt. King, is 52° 16′ 35″; the long. we assume as 68° 56′ 39″.

In rounding the Virgins' Cape, H.M.S. *Adventure* passed at 1½ mile from it, sounding in 8 fathoms, stones; and then, standing to the South, crossed a bank of gravel, sounding regularly in 7 fathoms, until Dungeness Point bore S.W. by W., when the water deepened.

Capt. King says:—In rounding the cape, unless the wind be easterly or southerly, I should recommend a ship to pass within 1¼ miles of it, and steer S. by E. (*by compass*), until Dungeness bears S.W.; then to edge away around the latter point, and afterward the coast is clear to Cape Possession. In moderate weather ships may anchor anywhere between Dungeness and Cape Possession. The bottom is of good holding ground, and quite clean. At from 3 to 5 miles from the coast the depth will be from 15 to 20 fathoms. (See, further, Captain King's Directions for the Strait, pp. 20—84.)

Captain King says:—"The advantage which a ship will derive from passing through the Strait of Magalhaens, *from the Pacific to the Atlantic*, for there must be some great one to induce the seaman to entangle his ship with the land when fair winds and an open sea are before him, is very great. After passing through the strait, the prevailing winds being westerly, and more frequently from the northward than from the southward of West, they are fair for his running up the coast; or, if not, the ship is not liable to receive much injury from the sea, which is comparatively smooth; whereas, to a ship passing round the Horn, if the wind be N.W., she must go to the eastward of the Falkland Islands, and be exposed to strong gales and a heavy beam sea, and hug the wind to make her northing. To a small vessel the advantage is incalculable; for besides filling her hold with wood and water, she is enabled to escape the severe weather that so constantly reigns in the high latitudes of the South Atlantic Ocean."

We may here observe that in our "DIRECTORY FOR THE NAVIGATION OF THE SOUTH PACIFIC OCEAN," second edition, 1863, pp. 1—36, will be found a lengthened description of the shores and harbours of the Strait of Magalhaens; and on pages 783—790, instructions are given for the passages through it from eastward and westward.

X.—THE COAST OF TIERRA DEL FUEGO TO CAPE HORN, ETC., INCLUDING STATEN ISLAND.

TIERRA OF TERRA DEL FUEGO has been repeatedly described by different navigators. It is a dreary country, distinguished by craggy mountains and barren isles. The inhabitants, wholly uncivilized, subsist on the flesh of seals and other gross substances; their dwellings are tents, rudely formed with poles, and covered with skins, or the bark of trees. A chain of stupendous rocks, extending through the great part of the country, is continually covered with snow.

The habits and manners of the Fuegians are described by Captain Weddell, in his Narrative, pages 148 to 156, &c.; and the writer says:—I would willingly, for the honour of human nature, raise these neglected people somewhat higher in the scale of intellectual estimation than they have reached; but I must acknowledge their condition to be that of the lowest of mankind. At this age of the world it appears almost incredible, and certainly disgraceful, that there should still exist such a tractable people in almost pristine ignorance. These inhabitants have been spoken of as if they were beings possessed of little more than animal instinct, and incapable of instruction; but the captain adds, that he found them not only tractable and inoffensive, but also, in many of their employments, active, ingenious, and certainly capable of improvement by intercourse with strangers.

The stature of the people is generally low: but the contour of their faces, and the form of their heads, are those which are found to be peculiar to most Indians. They have flat noses, small eyes, full and well formed chests, small arms, legs small and ill-shaped. The women are better featured than the men. The only clothing the male wears is a skin over their shoulders, reaching a little more than half-way down the back; some have not even this sorry garment. The women have generally a larger skin over their shoulders, and are, in other respects, clothed as decency requires; and even the youngest of their female children have the same covering, which evinces a degree of modesty seldom found amongst untutored people.

The STRAIT of LE MAIRE, between Tierra del Fuego and Staten Island, was so named from the navigator who discovered it in 1616. It is said, in the relation of Anson's Voyage, that it is difficult to determine exactly where the strait lies, though the appearance of Tierra del Fuego be well known, without knowing also the appearance of Staten Land; and that some navigators have been deceived by three hills on Staten Island, which have been mistaken for the *Three Brothers* on Tierra del Fuego, and so overshot the strait. But Captain Cook says that no ship can possibly miss the strait that coasts Tierra del Fuego within sight of land, for it will then of itself be sufficiently conspicuous; and Staten Land, which forms the eastern side, will be still more manifestly distinguished, for there is no land on Tierra del Fuego like it. The Strait of Le Maire can be missed only by standing too far to the eastward, without keeping the land of Tierra del Fuego in sight; if this be done, it may be missed, however accurately the appearance of the coast of Staten Land may have been exhibited; and, if this be not done, it cannot be missed, though the appearance of that coast be not known. The entrance of the strait should not be attempted but with a fair wind and moderate weather, and upon the very beginning of the tide of flood, which happens here, at the full and change of the moon, about 1^h. It is always best to keep as near to the Tierra del Fuego shore as the winds will admit. By attending to these particulars, a ship might get quite through the strait in one tide; or, at least, to the southward of *Success Bay*, into which it would be more prudent to put, if the wind should be southerly, than to attempt the weathering of Staten Land with a wind and lee current, which may endanger her being driven on that island.*

The Bay of Good Success is the place within which, in the year 1769, Mr. Banks and Dr. Solander found the cold so intense, that the latter had nearly fallen a sacrifice to its severity, though in the midst of summer. Dr. Solander, who had more than once crossed the mountains which divide Sweden from Norway, well knew that extreme cold, especially when joined with fatigue, produces a torpor and sleepiness which are almost irresistible; he therefore conjured the company to keep moving, whatever pain it might cost them, and whatever relief might be promised by an inclination to rest: "Whoever sits down," says he, "will sleep; and whoever sleeps will wake no more." The doctor, who gave this advice, was the first who yielded to the sensation which he had described; but, by exertion, he was saved; two other persons perished.

Good Success Bay is an excellent anchorage for vessels of any size to stop in for wood or water; but it would not answer if a vessel required to lie steady for repair, as a swell frequently rolls in. It is quite safe; yet in the winter season, when easterly gales are common, no vessel should anchor so near the head of the bay as she might in summer; for heavy rollers at times, though rarely, set in. Fish we did not try to get, not having any spare time, and only a few birds were shot.

The soundings are tolerably regular, and may give notice of an approach to Staten Land, or to the N.E. coast, and may guide a ship to the fairway of the Strait; but I should not place much confidence in them, near such a rocky coast as that of Staten Land.

STATEN ISLAND, which was surveyed in 1828 by Lieut. E. N. Kendall, of

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* Cook's First Voyage, dated 16th January, 1769. If we may judge from the varying descriptions, we may suppose that the climate has really ameliorated since 1769. Similar remarks have been made with regard to the Falkland Islands.

H.M.S. *Chanticleer*, is 38 miles in extent from Cape St. John to the E.N.E., and Cape St. Bartholomew to the W.S.W. The island is described as extremely mountainous and rugged, being composed of a series of lofty precipitous hills (2,000 feet and some 3,000 feet in height), clothed nearly to their snowy tops with forests of evergreen beech trees, the laurel like winter's bark, and the holly-leaved barberry: these are all evergreens; besides, there are a host of minor plants. The low ground is extremely swampy and boggy, in many parts a perfect quagmire. The writer of this description says, that the cold of these regions is a fable, and at variance with truth and nature. At Cape Horn, in lat. 56° S., vegetation was in full vigour in May, or the November of their year, and snow rarely lies upon the low grounds. In fact, we have sufficient matter to elucidate the climate of the South, and to establish its comparative mildness with the North, especially if America be taken as the example. The summers of the South are by no means warm or hot, nor winters cold; but to compensate for this, it is the region of wind, storms, and rains, perpetual gales, and eternal rains: never twenty-four hours without rain. It is the court of Eolus. The barometric pressure low, the mean being 29.32 inches,—magnetic intensity low,—the winds almost westerly,—electric phenomena extremely rare. These are the outlines of the climate, to which great attention was paid on board the *Chanticleer*, with the best possible instruments.

Mr. Webster's description of the climate of Staten Island and Tierra del Fuego, with those of Captains Monteith and FitzRoy, have been already given in the present work, pages 7, 8, 9. Captain Morrell, on passing between Queen Catharine's Foreland and Cape St. Sebastian,—the lattter in lat. 53° 26′, long. 67° 57′,—remarks that thick and wet weather is very uncommon on that part of the coast. The cape of St. Inez is in lat. 54° 8′, long. 66° 57′ 45″, and is a very remarkable part of the coast, from the appearance of a table land, which is commonly made by those bound round to Cape Horn. Between Cape St. Sebastian and Cape St. Inez the shore is generally rocky, and dangerous to approach in the night.

Tee eastern extremity of Tierra del Fuego, on the western side of the Strait of Le Maire, are the Capes of *St. Vincent*, of *St. Diego*, and *Good Success*; and near the middle of the strait, between the Capes of St. Diego and Good Success, is *Success Bay*, which has been already mentioned. Cape St. Diego, the north-easternmost of the three capes, lies in lat. 54° 40′ 35″. long. 65° 2¼′. It is low, but a ship may go close to it. There are shoaler soundings toward the East, for about two miles, than in other parts hereabout; for a rocky ledge, under water, seems to project from the cape. On this ledge are overfalls, strong eddies, and a violent race of tide when the wind is opposed to it, which is dangerous to small vessels.

Cape St. Vincent, to the westward of Cape St. Diego, is a rocky point with low bluffs above it. Between it and Cape St. Diego is *Thetis Bay*, a tolerable anchorage during West and southerly winds, though the bottom is rocky in many places. Between the heads the tides run with great strength; therefore a ship should anchor off a green bluff at the West side, and within the line of the heads, where she will have from 6 to 12 fathoms of water, over a coarse sandy bottom, mixed with patches of rock.

Beyond Cape St. Vincent the land trends to the West and N.W.; it is rather low near the sea, but within are many hills, partially covered with wood. Regular soundings extend to seaward for many leagues; and good anchorage may be found near the land, or on any part of this coast during westerly winds.

The *Jaseur Reef*, on the eastern side of the strait, about 3 miles West from the Middle Cape of Staten Island, will be noticed hereafter.

STRAIT OF LE MAIRE.—*The Cape of Good Success*, in lat. 54° 55′, is the S.E. point of Tierra del Fuego. It is high and bluff, and some rocks lie close to it, above water. To the W.N.W. of it is the *Campana*, or *Bell Mountain*, which is seen far off at sea, from the North as well as from the South. It is high, and takes its name from its resemblance to a large bell.

Rather more than 2 miles north-eastward of Cape Success is a projecting headland, which at first appears to be the Cape. Two rocky islets show themselves close to it, and, from a distance, appear like a ship under sail. Six miles from these rocks, N. ¾ E., is *Good Success Bay*, which is visible from the northern entrance of the strait. This bay is about 2 miles wide, and extends into the land, westwardly, 2½ miles. It may be easily known by a peculiar mark or feature on its southern side, resembling a broad turnpike road extending into the country from the shore. The anchorage is good all over it, in from 4 to 12 fathoms of water, clear ground. Here a vessel lies perfectly safe, provided she does not anchor too far in toward the sandy beach at its head; for during S.E. gales a heavy swell, with dangerous rollers, sets right into the bay. Elevated lands, of about 1,200 feet above the level of the sea, surround the bay, therefore, with strong winds, it is subject to squalls, which, during westerly gales, are very violent.

Although this is an excellent stopping place for vessels of any size, in which they may find wood and water, it will not answer if a vessel requires to lie steady for repairs, as a swell frequently sets in. In the winter season, when easterly winds are common, no vessel should anchor so near the head of the bay, as she may in summer.

The eastern side of the Strait of Le Maire, already noticed, is formed by the very irregular bays and rugged capes of Staten Island. Surrounding the latter are heavy tide rips, which extend outward to a considerable distance, and render a near approach very dangerous. The *Middle Cape* lies in lat. 54° 48′ 20″, long. 64° 42′ 30″. This, with *Cape St. Anthony*, the N.W. cape, and *Cape St. Bartholomew* the S.W. cape, are high, bluff promontories.

The soundings in the strait are regular near the southern entrance, 70 to 30 fathoms, over a sandy bottom. Toward the North the soundings diminish; and at 2 miles from Cape St. Diego are not more than 30 fathoms, over a rocky bottom. The strait is generally clear, excepting a reef discovered by Captain E. Handfield, in passing through in H.M. sloop *Jaseur*, in 1827, which lies at about 3 miles West from the Middle Cape. It appeared to be about 1½ mile in extent, and the sea broke violently on it.

The TIDES of Good Success Bay and the Strait of Le Maire are as regular and as little to be dreaded as in any part of the world where they run with strength. They will materially assist any vessel in her passage through the strait, which is very wide, perfectly free from obstacles of any kind, and has Good Success Bay close at hand, in case wind or tide should fail. When the tide opposes the wind and swell, there is always a heavy, and for small vessels, dangerous "race" off Cape San Diego; in one spot, where the water is more shoal than elsewhere, 5 fathoms only were subsequently found at a neap flood tide; but let it be remembered, that on another day, at the top of the springs, being the day after full moon, we passed the same spot, at half flood, with the water perfectly smooth; and although strong eddies were seen in every direction, the vessel's steerage was but little affected by them. It is high water in Success Bay soon after 4 p.m. on the full and change days, and low water at 10 a.m. The flood tide stream begins to make to the northward about an hour after low water, and the ebb to the southward about the same time after high water. The tides rise from 6 to 8 feet perpendicularly.

At Cape Pillar the turn of tide, with high water, is at noon; but along the S.W. and S.E. coast the time gradually increases to this coast. From Cape San Diego the flood tide sets North and West along the shore, from 1 to 3 knots each hour, as far as 20 miles along the shore, and the ebb in a contrary direction, but not so strong, except in San Vincente Bay. The flood in the Strait of Le Maire runs about 2 knots in mid-channel, more or less according to the wind, and the ebb about I knot an hour. Perhaps at times, when a strong spring tide is retarded in its progress by a northerly wind, there will be a dangerous over-fall off Cape San Diego, like the bores in some parts of the world. See also page 22.

HARBOURS, &c., of STATEN ISLAND.—Off the North side of Staten Island is the group of islets called *New Year Isles*, lying between long. 64° 3′ and long. 64° 13′, and the northernmost in lat. 54° 39½′ To the S.E. by S. [*S. by E.*] from the latter is an inlet named *New Year Harbour*, about half a mile broad, and extending 3 miles to the S.W., and having the depths of 30 to 45 and 20 fathoms. A cluster of islets lie in the entrance, and the passage in is on the eastern side. Captain Morrell says, Here you may have any depth of water from 30 fathoms to 5, with a bottom of mud and sand. Its shores abound with wood and fresh water. Scale fish of various sorts may be caught with hook and line, and sea fowl shot in several directions. Fresh, green celery in its season can be had in any quantities, together with some berries of an agreeable flavour.

Next to the New Year Harbour, at half a league to the East, is *Port Cook*, a smaller inlet, wherein the late Capt. Foster erected his observatory. It is surrounded by very high land, a mountain on its western side being 2,070 feet in height above the level of the sea. The entrance is very narrow, and has a depth of only 6 fathoms, but within the depth increases to 16 and 20 fathoms. Lieutenant Kendall, in his memoir on Staten Island, states that this is decidedly the harbour most eligible for a ship in want of shelter, from the considerations of its affording good anchorage at its entrance, in not too deep water, the greater regularity of the prevailing winds, and the facility of communication with the South side of the island, by means of a low isthmus separating it from *Port Vancouver*, a shoal inlet on that side.

Cape St. John is the easternmost point of Staten Island. It is high and precipitous, and a heavy tide rip extends from it 5 or 6 miles to seaward, setting at the rate of 6 miles an hour, to the N.N.E. flood, and S.S.E. with the ebb; but the tide sets along shore, both on the North and South, from East to West, from 3½ or 4 to 2 or 2½ miles an hour. Off Cape St. Bartholomew, the S.W. point of the island, the tide-rip, with flood, sets to the S.W., 5 or 6 miles an hour. This tide-rip likewise is very heavy, and extends 5 or 6 miles to seaward.

St. John's Harbour lies within the promontory of St. John, on the West. It is free from danger, surrounded by high land, and its general depths are from 25 to 20 fathoms, decreasing toward either shore. From the entrance the harbour curves in a S.W. direction to the extent of 3½ miles, but is little more than half a mile broad. The hills of the promontory, on its eastern side, are 800 or 900 feet in height, and at its head on the S.W. is a remarkable elevation, now known as *Mount Richardson*.

Lieutenant Kendall has described this harbour, and says that it may be easily recognised at a distance by Mount Richardson. On nearing it, a remarkable cliff, like a painter's muller, appears on the eastern shore, which is high and steep. Allowance must be made, in steering, for the set of the tide, which at all times runs rapidly across the mouth of the harbour; it is, however, less sensible when within the headlands forming the N.W. bay, in which, in case of necessity, or to await the turn of the tide, an anchor may be dropped in from 20 to 30 fathoms. The mouth of the harbour is wide, having 25 fathoms in the centre, with a rock standing off at some distance from the western point, to which a berth must be given. The shores, with this exception, are bold; and immediately within the western point is a small bay, where anchorage may be had in 10 fathoms. The most sheltered situation is at the head of the harbour, 3 miles S.S.W. from the entrance, where any depth may be chosen between 20 and 5 fathoms, with sandy bottom, and moor with an open hawse to the S.W., from whence the gusts that come from the mountains are violent. The wind, anything to the westward of W.N.W., or even N.W. outside, will be found to draw out of the harbour on nearing its head; and if at all strong it will be impossible to beat farther, as it follows the direction imparted to it by every ravine in the hill as it passes; and, therefore, warping will be found the only means of advancement, taking care to have hands by a bower anchor ready to let go, and the cable stoppered at a short scope, in the event of the hawsers being carried away. A ship may readily heave down on a beach of sand at the head of the harbour.

Wood and water are plentiful, and easily procured; celery and wild fowl (race horse or steamer ducks, kelp and upland geese), may also be obtained; and in the proper season, October, a good supply of penguins' eggs may be insured by having men in attendance at a *rookery* about a mile to the eastward of the harbour's mouth, whither they could walk along the eastern hills, from the vicinity of the *Painter's Muller*, and remain to collect daily the eggs as deposited, and secure them until a favourable opportunity is offered of embarking them from the foot of the cliff on which the rookery is established.

The shores of St. John's Harbour are lined with kelp, which is an excellent indication of its navigable part, the border of it being almost invariably in 8 fathoms, and that close to the shore, the depth rapidly increasing toward the centre, until near the head of the harbour, where the depth gradually decreases to the beach.

Westward of Cape Colnett, or the meridian of 64° 16′, are the small harbours named *Port Parry* and *Port Hoppner;* and within New Year Isles, to the West of New Year Harbour, is another, *Port Basil Hall.* These are of inferior consideration, but have been described by Lieut. Kendall, as given in the Appendix to Mr. Webster's Narrative, before noticed.

To the southward of Staten Island but little amount of tide is perceptible; there is, however, a remarkable undertow, which renders it dangerous for boats to stretch across the mouths of the deep bays, as it is difficult to close again with the land, for which reason the sealers invariably follow the circuitous route of the shores.

Mr. Webster, in his copious description of the vegetable productions of Staten Island, has noticed the vast masses of seaweed which entangle the shores. The sea teems with them, especially in the rough and open bays, while they are comparatively rare in the still, sequestered creeks. Did they increase in the calm harbours as upon the rougher shores, they would be choked up; and they would form an impervious mesh of cords. But they thrive best in the boisterous element; and where it would seem impossible to obtain a hold, they there grow and gather strength to meet the storms.

Many pages might be justly devoted to the plants of the sea. Here they are gigantic in form, some being 300 feet in length; some of immense strength and sturdy stems, and becoming, as it were, oaks in the sea; others again spread their tough and leathery substance like hides, so that buckets, bowls, and cups may readily be made of it. Some form ropes and cables to moor boats with; some yield a jelly pure and tasteless, like isinglass, far exceeding that of the *fucus crispus*, or Carrageen moss of our shores; and it is added that, amid the vast forests of seaweed, here described, multitudes of curious specimens may be obtained. See also upon this subject pages 148, 149.

FROM THE STRAIT OF LE MAIRE TO CAPE HORN, ETC.

From Cape Good Success, which has been described in page 436, the coast of Tierra del Fuego trends westward to a small bay, called *Acquirre Bay*, in long. 65° 44′, a place fit only for temporary anchorage during northerly or westerly winds; but under *New Island*, to the S.W. from this place, good temporary anchorage during westerly winds may be obtained. To the southward of New Island is the smaller isle, called *Evout Island*, the centre of which is now represented in lat. 55° 33′, long. 66° 41′.

The centre of a low, rocky group, called *Barneveldt Isles*, is in lat. 55° 48′ 54″, long. 66° 40′ 20″. These are surrounded by deep water, but ships should always keep to the eastward of them, as there may be dangers, yet unknown, on the West. Nothing but a little grass grows on the larger islet.

HERMITE ISLES.—**CAPE HORN** (properly *Hoorn*) is the southernmost point or headland of a group called *Hermite Islands.* A representation of it is given on the chart. The name of these isles was imparted from that of Admiral Hermite, commander of the Dutch fleet, who visited this coast in 1624. Captain Cook, in his passage in December, 1774, brought Cape Horn to bear E. by S., and says it is known, at a distance, by a high, round hill over it. A point to the N.W. shows a surface not unlike this; but their situation alone will always distinguish the one from the other. Capt. Cook gave the situation of the cape as 55° 58′ S., and 67° 13′ W., from his observations made in 1769; but he adds that his subsequent observations placed it in 67° 19′; which, it may be seen, is not so correct. On the N.W. side of the cape are two peaked rocks, like sugar-loaves, lying N.W. by N. and S.E. by S. (*by compass*) from each other. Some other straggling low rocks lie West of the cape, and one South of it, but they are all near the shore.

In the direction of E.N.E., 3 leagues from Cape Horn, is *Cape Enganno*, the *Mistaken Cape* of Capt. Cook; it is a rocky point, and the southern point of the easternmost of the Hermite Isles, now distinguished by the name of *Wollaston*.* Captain Cook has said—"In some charts Cape Horn is laid down as belonging to a small island. This was neither confirmed, nor can it be contradicted, by us; for several breakers appeared on the coast, both to the East and West of it, and the hazy weather rendered every object indistinct. The summits of some of the hills were rocky, but the sides and valleys seemed covered with a green turf, and wooded in tufts."

Captain King says that there is nothing very striking in the appearance of Cape Horn, as seen from a distance; but, in passing near it, is more remarkable, showing high black cliffs toward the South. It is about 500 feet high above the sea, in lat. 55° 58′, long. 67° 13′.

One mile to the westward of Cape Horn are three rocks, generally above water, and over which the sea always breaks.

Wigwam or St. Martin's Cove, on the eastern side of Hermite Island, westward of Cape Horn, has been described by Captain Foster, who states that it bears from the cape W.N.W. ¾ W. [*N.W. ¼ W.*] about 10 miles, and is a place of easy access with N.E., East, and S.E. winds. It is open to the East, and may be readily found by means of *Chanticleer Island*, which lies about a mile *true* East from the South head of the entrance. With westerly winds, which are adverse and prevalent, vessels should anchor off the entrance, in about 22 fathoms, and warp into the cove, where there is a convenient berth in 18 fathoms, sandy bottom, midway from either side, and about half a mile from the head of the cove. This anchorage is safe, although the gusts of wind in westerly gales, which are of frequent occurrence at all seasons of the year, rush down the sides of the mountains in various directions with impetuous violence, and may be very properly called *hurricane squalls*. They strike the ship from aloft, and have more the effect of heeling the vessel than of bringing a strain upon the anchors, which, when once imbedded in the sandy bottom, hold remarkably well, and will cost a heavy heave in weighing.

Wood and water abound in every part of the cove, but cannot always be procured, from the steepness of the shores, and the heavy swell that sometimes sets in. The water is highly coloured by the vegetable matter through which it percolates; but no other inconvenience from its use was found than that of imparting to tea a deeper colour, and somewhat unpleasant flavour. The wood was very much twisted and stinted in growth, and did not seem fit for any other purpose than fuel.

The shores of the cove are skirted with kelp, which serves to protect the boats in landing; and amongst which fish also are to be caught with a hook and line, abreast of the rills of fresh water that discharge themselves into the sea. From the natives was obtained a knowledge of this most valuable supply, by observing them in the act of fishing, which is ingenious; they have a line, and to the end is fastened a limpet, which the fish eagerly swallow, and not being able whilst in the water to disgorge it, are thereby drawn to the surface, and taken by the hand. In this manner they have been known to catch several dozen in the course of a few hours; but I am induced to believe that it is only in the summer months of these regions that supplies of so salutary a nature can be procured. The wild fowl that are most palatable consist of geese and race horses, called *steamers* by the sealers. Both sorts are well tasted, and were found agreeable. They were generally seen among the kelp in the cove about daybreak, but soon afterward would depart for their daily places of resort.

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* Strangers should be careful not to mistake this cape for Cape Horn; for such mistakes have occurred, as the name imports. Off the cape are several rocks, all above water, and at 2 miles to the S.E. is a cluster rising 30 or 40 feet above the sea.

At the head of the cove, and a few feet beyond the reach of high water, spring tides, abundance of celery is to be found, as also in many other places in the cove. During two months of the latter part of the autumnal season a sufficiency was daily procured for the use of the ship's company; and although of not so luxuriant a growth as in December, it was, nevertheless, considered wholesome. Lat. 55° 51′ 20″, long. 67° 31′. Variation, 23° 9′ East. High water, full and change, at 3^h 50^m. Rise about 8 feet. It appeared that the flood came in from the southward.

DIEGO RAMIREZ, discovered in 1619. These are a cluster of great, barren rocks, 18 leagues south-westward from Cape Horn, which extend N.W. and S.E., 4 or 5 miles. The channel between is entirely clear. Position of the centre, according to Captain King, &c., lat. 56° 24′ 30′, long. 68° 37′.

There are three principal isles, and many rocks above water. The appearance of them is given on our chart. The centre isle is the largest; it has tussac upon it, but neither wood nor water, and is frequented by various oceanic birds. The second in size has a shingle beach, where a boat may be hauled up in safety; and there is enough good water on the East side of the same island to supply thirty men. A furious surf breaks on the West shore, and sends a spray over the whole island. There is no sheltered anchorage for a vessel. The westernmost rock is the highest, and is surrounded by several small rocks, sufficiently elevated for birds and seals. Around the rocks the water is bold within a cable's length; and in clear weather a ship may safely run for them in the night, by keeping a good look-out. The highest point is about 200 feet above the sea. They are quite similar to the Ildefonsos; the top of a ridge of hills showing above the water, and broken through by the sea.

On the East side is a depth of 30 fathoms, with a bottom of fine green sand. The tide of flood here runs to the N.E., and apparently to the eastward, among many of the main islands.

Captain Collnett says that in general the birds hereabout resemble the dun crow, common in Hampshire in the winter, and which has been seen daily from the parallel of the Falkland Islands.

ISLES of St. ILDEFONSO.—These are a group of rugged islets and rocks above water, bold-to, and within which Captain Cook passed to the eastward in December, 1774. They extend 5 miles in a N.W. and S.E. direction, are very narrow, and about 100 feet high above the level of the sea. They have been much frequented by the sealers. Their distance from the nearest point of the main is about 20 miles. *Position*, lat. 55° 51′, long. 69° 11′. The passage between them and Diego Ramirez is 35 miles wide, and entirely free from danger.

Capt. Weddell says that the largest isle is not more than a quarter of a mile long. On a N.W. or S.E. bearing the whole appears as two isles only; but the northern one is merely a cluster of detached rocks; the southern islet is the largest and highest, and contains a quantity of tussac on its top, and sea gull rookeries. The isles have no beaches, and can be landed on only when the water is very smooth. Between them is a channel of a mile wide, which, being rocky, should not be used.

GENERAL REMARKS ON THE PASSAGE ALONG THE EASTERN COAST OF PATAGONIA, AND AROUND CAPE HORN, ETC. BY CAPTAIN P. P. KING, AND CAPTAIN F. W. BEECHEY, R.N.

We have already, in the present work, given the instructions and opinions of many eminent individuals as to the best passages and best seasons for passing Cape Horn, &c.; but as those opinions fluctuate, it cannot be deemed superfluous to produce, if possible, an ultimate decision of this very important topic, and we therefore now add, for that purpose, first, the General Remarks of Capt. King, 1826–1830; and secondly, those of Capt. Beechey, 1825–1828.

Capt. King, in his remarks upon the passage and round Cape Horn, &c., has said: Ships bound from the Atlantic to any of the ports in the Pacific will find it advantageous to keep within 100 miles of the coast of Eastern Patagonia, as well to avoid the heavy sea that is raised by the westerly gales, which prevail to the eastward, and increase in strength according to the distance from the land, as to profit by the variableness of the wind when fixed in the western board. Near the coast, from April to September, when the sun has North declination, the winds prevail more from the W.N.W. to N.N.W. than from any other quarter. Easterly gales are of very rare occurrence; but even when they do blow, the direction being obliquely upon the coast, I do not consider it at all hazardous to keep the land on board. In the opposite season, when the sun has South declination, the winds will incline from the southward of West, and frequently blow hard; but as the coast is a weather shore, the sea goes down immediately after the gale. In this season, although the winds are generally against a ship's making quick progress, yet, as they seldom remain fixed in one point, and frequently shift backward and forward six or eight points in as many hours, advantage may be taken of the change, so as to keep close in with the coast.

Having once made the land, which should be done to the southward of Cape Blanco it will be beneficial to keep it topping on the horizon until the entrance of the Strait of Magalhaens be passed.

With respect to this part of the voyage, whether to pass through Strait Le Maire, or round Staten Island, much difference of opinion exists. Prudence, I think, suggests the latter; yet I should very reluctantly give up the opportunity that might offer of clearing the strait, and therefore of being so much more to windward. With a southerly wind it would not be advisable to attempt the strait; for with a weather tide the sea runs very cross and deep, and might severely injure and endanger the safety of a small vessel, and to a large one do much damage. In calm weather it would be still more imprudent (unless the western side of the strait could be reached, where a ship might anchor), on account of the tides setting over to the Staten Island side; where, if it becomes necessary to anchor, it would necessarily be in very deep water, and close to the land. With a northerly wind the route seems not only practicable, but very advantageous; and it would require some resolution to give up the opportunity so invitingly offered. I doubt whether northerly winds, unless they are very strong, blow through the strait; if not, a ship is drifted over to the eastern shores, where, from the force of the tides, she would be quite unmanageable.

Captain FitzRoy, whose authority, from his experience, must be very good, seems to think that there is neither risk nor difficulty in passing the strait. The only danger that does exist, and that may be an imaginary one, is the failure of the wind. Ships passing through it from the South are not so liable to the failure of the southwesterly wind, unless it be light, and then it will probably be from the N.W., at the northern end of the strait. The anchorage in Good Success Bay, however, is admirably situated, should the wind or tide fail.

In passing to leeward of Staten Island, the tide race, which extends for some distance off Cape St. John, at the N.E. end of the island, must be avoided; otherwise there exist no dangers.

The anchorage under New Year Islands, although it is a wild one and the bottom bad, and the tide very strong, yet offers good shelter from S.W. winds, and may be occupied with advantage during the existence of a gale from that quarter, since it is unfavourable for ships bound round the Horn.

After passing Staten Island, if the wind be westerly, the ship should be kept upon the starboard tack, unless it veers to the southward of S.S.W., until she reaches the latitude of 60° S., and then upon that tack upon which most westing may be made. In this parallel, however, the wind is thought to prevail more from the eastward than from any other quarter. Never having passed round Cape Horn in the summer season, I may not perhaps be justified in opposing my opinion to that of others, who, having tried both seasons, give the preference to the summer months. The advantage of long days is certainly very great; but from my experience of the wind and weather, during the opposite seasons, at Port Famine, I preferred the winter passage, and in our subsequent experience of it found no reason to alter my opinion. Easterly and northerly winds prevail in the winter off the cape, whilst southerly and westerly winds are constant during the summer months; and not only are the winds more favourable in the winter, but they are moderate in comparison to the fury of the summer gales.

Having passed the meridian of Cape Pillar, it will yet be advisable to take every opportunity of making westing in preference to northing until reaching the meridian of 82° or 84°, which will enable a ship to steer through the north-westerly winds that prevail between the parallels of 50° and 54°.—*Captain King's Directions*, pp. 138—140.

PASSAGES OF THE BLOSSOM, CAPTAIN, NOW REAR-ADMIRAL, BEECHEY.

We have given, in a preceding page, Capt. Beechey's description of the *Pamperos* and other winds which he experienced between Rio Janeiro and the Falkland Islands, to the East of the latter. Captain B. adds, in continuation:—As we neared the land, the wind died away. The barometer was low, standing at 28,6 and the weather was misty, with drizzling rain at times. About 1^h p.m. on the 9th of September (1825), the mist began to disperse, and a bright yellow sky was seen under an arch to the S.W.; the wind at the same time inclined that way, and in less than an hour we were under close-reefed topsails and storm staysails. This gale lasted about eighteen hours, and then veered to the W. by N. and West, with which we advanced to the parallel of Cape St. John. Here we encountered strong S.W. winds with long heavy seas, and stretched to the southward to 58° 2′ S., *regretting that we had not passed inside the Falkland Islands;* as in that case we should have been nearly a day's run further to the westward before we encountered these adverse winds. After two days the wind veered to S.S.W., and blew hard, but the sea was not high. We now stood to the N.W.; and on the 17th, in lat, 56° 21′ S., long. 61° 51′ W., had a few hours' calm. This was succeeded by a breeze from the southward, and continued moderate with fine weather and a smooth sea; and the next day, having carried us 123 miles, we made Cape Horn, 14 miles distant on the lee beam, bearing N. 2° W. *true;* the wind still from the southward.

Between Cape Horn and Diego Ramirez we had soundings, with 45 fathoms rock and 60 fathoms sand; and afterward from 84 to 60 fathoms gravel, coarse and fine sand, and some coral. That night we passed to the northward of Diego Ramirez at 9 miles distant, not having less than 60 fathoms on a bottom of coarse sand. The following morning the Isles of Ildefonso bore N. 5° W. *true*, 9 miles, and we had 73 fathoms, fine sand; and at noon York Minster, at the entrance of Christmas Sound, bore N. 37° E. *true*, 19 miles; 82 fathoms, coral and stones. Not liking to range the shores of Tierra del Fuego so close during the night with a southerly wind, we tacked; and with the wind still at S.S.W. stood for thirty-six hours to the S.E. into the meridian of Diego Ramirez; and when 36 miles South of it we again kept W. by S., with the wind at S. by W. We stood on, and had light winds, fine weather, and a smooth sea, until the 24th, when there was a calm for twelve hours, with a little swell from N.E. On the 25th, early, we got a north-easterly wind, which commenced with fine weather and smooth water; and at noon, on the 26th, carried us to the 79th meridian and 53rd parallel of latitude, when we considred ourselves round the Horn. In this situation we were 143 miles West of Cape Pillar; having numbered exactly fourteen days from the time at which we were due East of Staten Land. We passed Cape Horn on one Sunday, and on the following crossed the meridian of Cape Pillar. Our greatest South latitude in the whole passage was 58° 2′. The gales of wind which we experienced were attended with a long swell, that by no means strained the ship, and we did not see a particle of floating ice.

With regard to the best time of the year for rounding Cape Horn, there is a great difference of opinion, as in the same months both good and bad passages have been made; but I should certainly not select the winter time, if I had my choice. Independent of the cold, which, during gales of wind, is severely felt by a ship's company necessarily wet and exposed, and the probability of meeting with floating islands of ice, surely the long nights, as Capt. Hall has justly observed, must augment, in a serious degree, the difficulties of the navigation.

From the passage of the *Blossom*, a preference might be given to the month of September; but in the very same month, Capt. Falcon, in the *Tyne*, had a long and boisterous passage. I concur in opinion with Cook, Pérouse, Krusenstern, and others, in thinking there is no necessity whatever for going far to the southward; and I should recommend always standing on that tack which gained most longitude, without paying any regard to latitude, further than taking care to keep South (say a degree) of Cape Horn. With a N.W. wind I would stand S.W., and with a S.W. wind N.W., and so on. If there were a doubt, I should give the preference to the southern tack, unless far advanced in that direction. We did not find the strongest winds near the land, but on the contrary; and I am of opinion that here, as is the case in many other places, they do not blow home; and that within 30 miles of the land the sea is broken by the inequality of the bottom. There is, however, great objection to nearing the land eastward of Cape Horn, in consequence of the velocity with which the current set through the Strait of Le Maire, particularly with a southerly wind. This does not obtain to the westward of Diego Ramirez, in which direction I see no objection to approaching the coast within 40 or 60 miles. Cook ranged this shore very close in December; and on more than one occasion found the current setting off-shore, and at other times slowly along to the S.E.

In the first part of this passage the currents ran to the N.W.; but after passing the latitude of 40° S., they set to the eastward; and when we arrived off Cape Horn the ship was S. 40° E. 116 miles of her reckoning.

While we were in the neighbourhood of Diego Ramirez there was little or no current, but to the westward it ran to the W.N.W. It however soon after changed; and, on our arrival off Concepcion, the whole amount of current was N. 49° E. 147 miles. In rounding Tierra del Fuego with a southerly wind, full 4 points must be allowed for variation and current. For in this high latitude there will, in most ships, be found 10 or 12 degrees more variation with the head West than East; and though the true variation be but 24° E., at least 29° or 30 must be allowed going westward.

We found the barometer in this passage an invaluable instrument; upon no occasion did it deceive us. In passing these latitudes my attention was drawn to the changes in the temperature of the water, which I usually found to precede a shift of wind from South to North, and *vice versâ*, even before that of the temperature of the air. I subjoin a short statement of these changes for the satisfaction of such as may feel interested in them.

On the 29th of August, at 8h a.m., the temperature of the surface was 58°, the weather moderate and cloudy, and the wind W.N.W.; from this time to midnight it gradually fell, until it stood at 48°. The wind now increased, and the next morning shifted to S.W. and S S.W., and blew fresh gales; the breeze continuing, on the 31st the temperature of the surface underwent a further fall of 3½°; and we had hard squalls, with hail and sleet. It afterward fluctuated four days between 46° and 49½°

during which time the winds were variable from S.S.W. to N.W. by N. and E.N.E.; the weather for the most part moderate and cloudy; but on the 5th (September) the the temperature (always alluding to that of the surface of the sea) rose to 53°, and the wind came from N.E. by N. and North, but light. The next day it shifted to S.E. by S., and the temperature rather decreased, but the breezes were light. On the afternoon of the 7th, after a calm, during which it remained at 50°, there was a decrease of 8°; and 36 hours after, a gale from S. by E. suddenly arose. During the five following days it was nearly stationary, at the temperature of 39½°, and the wind was variable from W.N.W., S.W., and West, blowing hard. From noon on the 12th, to 4^h a.m. on the 13th, it fell to 36°, and that night we had a gale at W. by S., which continued all the next day. At night there was a further decrease of 4°, when the wind veered to S. by W., and blew strong gales. The temperature kept down at 35° until midnight of the 15th, when it rose 5°; and the 16th, at 4^h a.m., the wind changed to W.N.W. and N.W. by W. The temperature, however, soon decreased again 4°; and at 9^h a.m. the following day, the wind came from S.W. by S. and S.S.E., where it continued, and the temperature remained nearly stationary until we made Cape Horn, when it rose to 42°.

It would, perhaps, be too hazardous to assert, upon such short experience, that these changes are the forerunners of shifts of wind, though I found similar variations attend the southerly gales of Spitzbergen, where we had always indications of their approach by the increase of the temperature of the sea. I am, however, persuaded that, like the barometer, it speaks a language which, though at times not the most intelligible, may nevertheless often prove useful.

ON THE HOME PASSAGE OF THE BLOSSOM, June 22nd, 1828, the ship had an easterly wind, which veered to S.E. and drove her away to the latitude of 56° 18′ S., and longitude 75° W., when she encountered S. by E. winds, which carried her past Cape Horn on the 30th. The winds were now fair; but off the Falkland Islands they were variable, until they settled in the E.S.E. quarter. With this she advanced to the 35° N., when she encountered N.E. and N.W. gales, with heavy cross seas, and then several pamperos, which were attended with vivid lightning. We afterward, says Capt. Beechey, made progress to the northward, and arrived at Rio Janeiro on the 21st July.

"In this passage, which was made in the depth of winter, the greatest cold was 21°. From Cape Horn to the Falkland Islands we had thick showers of snow; and had we been bound the opposite way, I have no doubt we should have felt the weather severely. The barometer, as on the former occasion, proved an invaluable monitor. From the time quitted Mas a Fuera until we were off Staten Land, the winds were advantageous for making the passage to the Pacific, and so far they favour the opinion of the winter time being the most desirable for this purpose. The current in this passage ran to the S.E. to the latitude of 46° S., then North two days, and from 48° to 57′ S., between N.W. and S.W., at the rate of 13 miles a day. From 57° S., and longitude 68° W., they ran to the N.E., until we had passed the cape, and then westerly and north-westerly to the Falkland Islands. Off the River Plata they ran to the S.W. and South. On our arrival at Rio Janeiro the whole effect of the current from Coquimbo was S. 62° W. 82 miles."

From the experience of these two passages round the Horn, I am of opinion that a ship bound to the Pacific should pass inside the Falkland Islands and round Staten Land, as closely as possible; as she will most likely encounter S.W. winds directly the Pacific is open. A N.W. wind off the Falklands will, I think, generally veer to West and S.W. on approaching Staten Land. With S.W. winds off Staten Land, nothing is left of course but to stand to the southward. I should not, however, recommend keeping this board longer than to get an offing, except westing was to be made by it; and if not, I would go about directly a mile of longitude was to be gained on the inshore tack; avoiding, however, a near approach to Tierra del Fuego, eastward of Cape Horn, on account of the north-east set through Strait Le Maire, with southerly winds. I see no good reason for going to a high southern latitude, if it can be avoided without loss of longitude. With regard to the fact, that gales of wind are stronger near the land, I own I cannot concur in such an opinion. On a comparison of the *Blossom's* passage out with that of a brig recommended by a Lieutenant Parker, which rounded the Horn at the same time, it appeared, that whilst she was experiencing strong winds and heavy seas, which washed away some of her boats, the *Blossom*, close in with the land, had fine moderate weather, and no other indication of the gales the *Hellespont* was encountering than by a long southerly swell setting upon the shore; and that the *Blossom* had the advantage of a westerly current, while the brig was put back 20 miles daily by one in the opposite direction.

With regard to passing inside or outside the Falkland Islands, I think the latter preferable, especially in winter, as the winds sometimes hang in the eastern quarter at that period, and are apt to run a ship in with the River Plata.

From the Falkland Islands to Rio Janeiro the winds are very uncertain. Ships may, however, generally reckon upon encountering, at least, one pampero, between 33° and 27° N., and on meeting with northerly or north-north-easterly winds, when within 200 or 300 miles of Cape Frio. It is better, in the latter instance, to stand out to eastward in preference to the other tack, as it will almost always happen that they will there meet an easterly wind to carry them up to the cape. It has been found very difficult to get up near the shore from Isla Grande and St. Catharine's.—*Captain Beechey's Appendix*, pp. 632—634.

The navigation around Cape Horn, and on the western coast of America, as well as of the whole of the Pacific Ocean, *will be* found in the DIRECTORY FOR THE NAVIGATION OF THE PACIFIC OCEAN, in 2 volumes. Part I., containing descriptions &c., of its coasts; Part II. of its islands, winds, tides, currents, sailing directions, &c,

SECTION VI.

THE COASTS OF AFRICA, FROM CAPE MOUNT TO CAPE LOPEZ, INCLUDING THE ISLANDS OF FERNANDO PO, PRINCES, ST. THOMAS, AND ANNO BON.

I.—GENERAL DESCRIPTION AND DIRECTIONS.

IN our book for the North Atlantic Ocean, we have given a description of, and dirictions for, the African coast, from the Strait of Gibraltar to the River Gallinas, or Galinhas; our present object is, therefore, to give a similar description of, and directions for, the coasts and harbours between Cape Mount and the Cape of Good Hope; and, farther, a continued description of the coast to Algoa Bay, &c. These we divide under two general heads; the first, from Cape Mount to Cape Lopez; and the second, from Cape Lopez to the Cape of Good Hope, &c.

The WINDWARD COAST, with which we commence our description, comprehends all the coast from *Cape Mount*, 15 leagues westward of Cape Mesurado, to the country in the victnity of Cape Lahou, nearly 2½° westward of Cape Three Points, where the GOLD COAST begins. The Windward Coast includes the three particular coasts called the *Grain Coast*, or *Malagette Pepper Coast*; the *Ivory*, or *Teeth Coast*; and the coast of *Adou*, or *Quaquas*.

The GOLD COAST extends eastward to the RIVER VOLTA. The interior, to the northward, comprises the kingdoms of Ashantee, &c. Beyond these, farther eastward, are the kingdoms of DAHOMEY, BENIN, and WARREE, extending, on the coast, from the River Volta to Cape Formosa. Thence follows the BIGHT of BIAFRA, from Cape Formosa to Cape Lopez, including the islands of Fernando Po, Princes, St. Thomas, and Anno Bon, all of which we include in the present section.

The NATIVES.—The general and particular circumstances, habits, and customs of the people of these countries have been very copiously described.* In matters of trade they commonly possess sufficient acumen; and it has been especially intimated to the European visitor that, in trading with them, punctuality is of the utmost importance; for confidence once lost by breach of contract, or unfair dealing, is not to be regained. Of their dialects, Captain Adams says:†—The Tower of Babel might have been built on the western shores of Africa, 5° North of the Equator, and its inhabitants dispersed to the Nort, East, and West; for almost every tide (and they are innumerable) has a distinct language, unintelligible to the others; and as they have not among them any written character, the different languages spoken can be learned only in those countries where they are used. The enunciation of all that I have heard spoken is soft and harmonious: the words composing them abound in vowels, and generally terminate in them. Their compound words seldom exceed four syllables; and frequently entire sentences not more. Their language is adapted to their habits and wants; and as these are extremely few and simple, and nearly similar in all, the construction of the different languages is the same.

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* In a subsequent page we have alluded to an excellent paper on the Ethnography of Akkrah, &c., by W. F. Daniell, Esq., M.D., F.R.G.S., F.E.S. The interesting work, by the same author, entitled "Sketches of the Medical Topography and Native Diseases of the Gulf of Guinea, Western Africa," 1849, contains many details on the same subject.

† Captain John Adams, in his "Sketches taken during Ten Voyages to Africa, between the years 1786 and 1800, with an Appendix on the European Trade, &c." 8vo., no date.

The Kroumen are, in many respects, an extraordinary race of people; and, as mentioned above, a different language is spoken at every 10 or 12 miles, though these different languages are generally understood by the natives all along the coast. The Kroumen have a singular custom, peculiar to themselves, which is a system of apprenticeship. A number of young men will attach themselves for a certain period to a headman. This headman has made one or more voyages to leeward to the Oil Rivers, before he can obtain a name, or be allowed to build a house, or to trade; and it is the duty of this headman to ship the boys off for the Oil Rivers on board of any vessel he can; and for this service the headman is entitled to one month's advance always paid by the ship. He is also entitled to a certain portion of the boy's wages on his return. When the boy has made two or three voyages, and can speak English fluently, he becomes a headman himself.

The language of Kroumen is principally a combination of vowels; and, from the peculiar nasal pronunciation, can rarely be acquired by Europeans. The Krouman is generally found faithful in a strange country, but must not be trusted in his own. Their national mark is an arrow on each temple, the point toward the eye.

Speaking of their physical qualifications, I believe them to be the bone and sinew of the negro races of Western Africa, the only men of the Ethiopian tribe who will bear any amount of hard work without complaining.*

In proportion as the vessel advances to the eastward, the natives will be found more barbarous, and consequently more treacherous; and about Drewin and St. Andrews they were formerly a fierce, unruly, and sanguinary race, notorious for their treachery and repeated attacks upon vessels. I have had no intercourse with these people for the last seven or eight years; but I am assured that their condition and manners is very much improved, and that small vessels may now trade there for ivory and palm oil in perfect safety, by adopting only common precautions. The St. Andrews people have been repeatedly fired upon by the crews of different vessels, for their various acts of theft and treachery; and it was formerly very unsafe to allow more than five or six of them upon deck at once, as they generally come on board armed with a long knife, in the use of which they were very dexterous. Upon one occasion I very suddenly dispersed a multitude of them off the deck, upon the very point of open warfare, by merely throwing about a dozen heads of leaf tobacco over the side, for they all immediately jumped overboard after it. Upon another occasion, the plentiful distribution of boiling water amongst them proved quite as efficacious. On board a French barque, where two of the crew had been wounded by the knives of the natives, they were beaten off with empty glass bottles, a large quantity of which happened to be on deck at the time. Harsh as these measures may appear, they are surely better and more humane than the use of cutlasses and muskets.

The natives of Cape Lahou in many respects resemble the Kroumen in their manners and disposition, and, like them, are almost amphibious. Cape Lahou may be considered as the western extremity of civilization on this part of the coast of Africa, for the Gold Coast may be here said to commence.—*Captain Midgley.*

CLIMATE, &c.—The extreme unhealthiness of Western Africa to the European constitution arises from its moist and hot atmosphere, impregnated, as it commonly is, the miasma or malaria of the marshes; but prejudicial as it is to the European, the natives seem to enjoy good health, and to live to a tolerably old age. The wet season, however, like the winter of Europe, produces inflammatory attacks of the lungs and pleura, with catarrh, or colds, &c.; and the Africans seem peculiarly sensible of the least change in the temperature of the atmosphere.*

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* Mr. Consul Hutchinson's "Impressions of Western Africa," London, 1858, see pages 49—54.

From some experiments on the waters of the rivers and coasts (in 1840), it was shown that this unhealthiness may arise from the extraordinary presence of sulphuretted hydrogen gas in these waters. In one instance it amounted to nearly as much as that contained in the well known springs at Harrogate, in Yorkshire, which owe their properties to the same cause. It is difficult to account for this important fact, but the deadly effects of the climate of this part of the world are very easily referrible to such a cause. It has been experimentally found that so small a mixture as a fifteen-hundredth part of sulphuretted hydrogen in the atmosphere acts as a direct poison upon small animals; and the sensations of languor and nausea described are exactly those which have been experienced by persons who have been exposed to its deleterious influence in small quantities.

The peculiar unhealthiness of mangrove swamps in all parts of the world probably arises from that tree requiring salt water for its growth, and its decaying foliage being thus brought into immediate contact with the sulphates. The hypothesis also agrees with the fact, which has been established, that the unhealthiness of such situations does not extend to any considerable distance from the sea.

What is known of the action of vegetable matter upon the sulphates, and the immense quantities of vegetable matters which must be brought by the rivers within the influence of the saline matters of the sea, renders this origin of the sulphuretted hydrogen extremely probable. The only other source from whence it could be derived would be volcanic action.

"When this matter was first brought under my consideration," continues Professor Daniell, "I was surprised that the nauseous smell which must be necessarily evolved from water impregnated with this gas, at so high a temperature as that of the equinoctial regions, had not been noticed. I have in consequence turned to some of the accounts of the late travels in Africa, to seek for evidence upon the subject; and in the Narrative of an Expedition into the interior of Africa, by the River Niger, by Macgregor Laird and R. A. B. Oldfield, I found the following important observations:—

"The principal predisposing causes of the awful mortality were, in my opinion, the sudden change from the open sea to a narrow and winding river, the want of the sea breeze, and the prevalence of the deadly miasma, to which we were nightly exposed from the surrounding swamps. The *horrid sickening stench* of this miasma must be experienced to be conceived. No description of it can convey to the mind the wretched sensation that is felt for some time before and after daybreak. In those accursed swamps, one is opprèssed not only bodily but mentally with an indescribable feeling of heaviness, languor, nausea, and disgust, which requires a considerable effort to shake off."

Another remarkable action of the water is the injurious effect it has upon the copper sheathing of vessels, and as the same agent will produce this result, nothing is wanting to identify this rapid decay of the ships' copper with that of the mortality of the climate. Although these views are questioned by some, still there is great probability of their being correct, and it is a subject well worthy of future inquiry.†

The narratives of the ill-fated Niger expedition, as well as of every other traveller who visits those regions, will place the mariner on his guard as to the best means of counteracting the deadly effects of the climate. In the Appendix will be found some medical hints for the preservation of health, which are recommended to attention.

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* Adams's Sketches, p. 69.

† See, also, "Nautical Magazine," November, 1841, pp. 737—8, and "Parliamentary Report." App.

DESCRIPTIVE REMARKS AND SAILING DIRECTIONS FOR THE NAVIGATION TO AND OF WESTERN AFRICA; WITH SOME ACCOUNT OF THE CURRENTS, SEASONS, ETC.; THE RESULT OF EIGHT YEARS ACTUAL EXPERIENCE, IN THE COMMAND OF FOUR DIFFERENT VESSELS, BY CAPTAIN THOMAS MIDGLEY, OF LIVERPOOL.*

On the passage from England to the Western Coast of Africa, it may be well to make the Island of Madeira and sail to the westward of it if possible; for by so doing the ship will be placed in the best position as to her future course. After passing Madeira, steer so as to leave Palma about 70 or 80 miles to the eastward (if nearer, the ship is liable to be becalmed), and then steer a course to make the N.E. end of Bonavista.—Bonavista requires a good berth, as the currents about it are strong and uncertain, and dangers extend from the North and East sides to a great distance from the land.

In the winter, when strong westerly breezes, of long continuance, prevail to the northward, it may be impossible to make Madeira without much trouble and delay; in this case, endeavour to get a good observation for longitude, or a sight of the Salvages; and, should westerly winds still continue, run boldly to the southward. On nearing the Canary Islands, you will find the wind either gradually decrease to a calm, or it will veer to the northward with heavy squalls. The squalls in this neighbourhood give little warning, but are frequently exceedingly heavy and dangerous. Any ship may very safely run through the passage to the eastward of Palma, as a strong steady N.N.E. or N.E. breeze almost constantly blows through it; and by keeping mid-channel, there is little fear of being becalmed. When clear of the Canaries, a course may be shaped to make Bonavista, as above directed.

The passage between the Islands and Cape Verde is generally and very properly adopted by vessels trading to the Western Coast of Africa; for, by running to the westward of St. Antonio, they have again to make easting in that tract of sea which, lying contiguous to the southern limit of the N.E. trade wind, is so often disturbed by calms, squalls, thunder, lightning, and heavy rain.

The currents between the coasts of Great Britain and the Cape Verde Islands are now so well known, that it is almost superfluous to make any further remark upon them, excepting that their velocity is by no means exaggerated; and the dangerous effect which they have upon vessels, between the Bay of Biscay and the Capes Noon and Bojador, on the African coast, cannot be too strongly impressed upon the minds of those who have charge of valuable lives and property.

Those *passing Bonavista* in the months of June, July, August, and September, should not be too anxious to make easting; for they will lose the trade wind very soon after passing the parallel of the Island of St. Jago, and, after a short interval of calm, fall in with the S.W. wind and its usual accompaniments of heavy squalls and rain. On the farther progress, the vessel makes to the southward and eastward, the S.W. winds generally become variable to the westward, and the squalls not so frequent.

At this season of the year it is advisable to give *St. Anne's Shoals* a berth of 50 leagues to the eastward, as the sea sets in so heavily upon the coast, between these shoals and Cape Palmas, that making southing when near the land, in these months, is attended with much difficulty.

From October to April or May the weather in this tract is generally fine, and the nights cool, beautifully serene and clear, with heavy dews; and in these months it more direct track may be pursued from Bonavista to the southward and eastward, than the one above mentioned. In the influence of the trades, the breeze is generally steady from N.N.E. and N.E., and the sea smooth; occasionally, however, interrupted by tornadoes, which, in the neighbourhood of Cape Verga and Sierra Leone, blow with terrible fury. Such is their violence, that it is frequently necessary to keep the ship directly before them, under a foretopmast staysail only.

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* In these Remarks, &c., by the late Captain Midgley, as in the other parts of this volume, the courses and bearings are by *compass*, unless where otherwise expressed; and every bearing or direction of the current is intended for the *true*.

Between the Cape Verde Islands and the coast, the currents in the above tracks are variable, but mostly found running to the southward, and seldom exceeding 1 mile an hour; generally from half to three-quarters of a mile, until hauling up for St. Anne's Shoals. At about 40 leagues to the westward of these, I have several times found them setting about E.S.E. by chart, fully 1½ miles in the hour.

The sea between the meridian of 20° W. and the Bank of Soundings extending from the African Coast, is perhaps the most luminous part of the Atlantic Ocean. In the very dark gloomy nights of the wet season, with a strong breeze of wind, and when not one solitary star is visible, nothing can exceed, no pen can describe, the awful grandeur and magnificence of the scene. The whole surface of the sea appears as one vast sheet of liquid fire; and the ship, sailing at the rate of 6 or 7 knots through the water, causes streaks of light to be emitted from the sea, that throw a strong yet sickly and appalling glare upon all the sails, creating an indescribable sensation in the mind, that is very far from being agreeable, as the vessel appears to be surrounded by breakers on every side.

Although I have several times noticed this luminous appearance in the same tract, I am led to remark more particularly upon it on account of a most awful night which I passed on the 24th of August, 1834, in or about lat. 7° 30′ N. and long. 17° 50′ W., which left an impression upon the minds of all on board that I fancy will not be very soon effaced; for the vessel appeared to be sailing through a sea of liquid fire, whilst the heavy dark mass of clouds appeared to rest upon her mast-heads, and not a a single star was visible amid the horrid gloom. No bottom was found at 120 fathoms. Temperature of the air, 82°, and of the water 79° (Fahrenheit).

Vessels in want of Kroumen should call at *Grand Sestros.*—From some years experience I can confidently say that they are the most willing and best disposed men upon the Krou Coast; and, if well used, are faithful to their employer in every difficulty he may have to contend with to leeward. Every vessel should take four or five, or more of them, in proportion to her size; for, in the Oil Rivers, if white men are exposed in the boats or canoes, landing or taking in casks, they very soon fall victims to the climate. The Kroumen prefer rice to any other diet, and a good supply can generally be procured at a cheap rate, except between January and June; but, considering the detention of lying-to, in order to procure it, the rice may be exported from England, for ships' use, at very nearly as cheap a rate. One of the Kroumen is of more real service in the Oil Rivers than two Europeans; they are generally well versed in the English language; and are contented with a dash or present when left at Fernando Po, after the vessel has completed her lading.

On approaching the Krou coast it is usual to hoist the ensign and fire a gun, and the vessel will be soon surrounded by canoes. A small canoe may be purchased for the ship's use for a mere trifle, and will be found extremely serviceable in the rivers.

The navigation between Cape Lahou and the land of Fermosa, presents no difficulty to the navigator: the currents in the route run to the eastward at 1, 1½, and sometimes 2 knots or more, in the hour. If there be no inducement to call at Bereby, Drewin, or Cape Lahou, for ivory, it will be as well (and will certainly expedite the passage) to shape a course from Cape Palmas for Cape Three Points; and then, giving that land a berth of 5 or 6 leagues, shape a course for the land of Fermosa.

In steering across the Bight of Benin, the current will be generally found running about 1 mile an hour to the N.E.; and must be allowed for, by steering one-third of a point to the southward of the direct course.

A mere inspection of the chart will show that what is erroneously called Cape Formosa is, in fact, an elbow land rounding off gradually to the eastward; and regular soundings upon a muddy bottom extend for some considerable distance to the westward and southward of it. The land is here extremely low, and should not be approached in the night nearer than in 8 or 10 fathoms, unless by a vessel prepared to anchor.

After making the land, the oldest and most experienced traders to the Oil Rivers are frequently deceived as to the position of the vessel. For the best description of the rivers from Fermosa to Bonny is but vague and imperfect; and I therefore proceed to give such directions as I think, from my own experience, will be found useful to vessels bound to the Bonny or New Calabar River.

The Rivers between Terra Formosa and Bonny have all shoal bars at the entrance, and generally appear from the offing to be narrow. They have no peculiar feature to distinguish them, other than their being open to such points of the compass as are expressed in the Sailing Directions.

SEASONS.—*The Seasons* here appear to have been imperfectly described. The rains generally commence in the latter end of May, or early in June, and gradually increase, with strong S.S.W. and S.W. breezes, during the months of July, August, and great part of September, toward the end of which month they as gradually terminate. In July and August heavy squalls frequently prevail; and in these months the wind very rarely shifts more than between S.S.W. and S.W., and the rain is incessant from sunset to nearly noon next day, when it ceases for a few hours, and again commences with more or less violence in the evening. In October the weather becomes more settled, with light land winds, and occasionally showers of rain, which however yield to the moderate sea breeze that sets in about ten or eleven a.m. In November the tornadoes commence, and are at first violent, gradually decreasing in strength as the *Harmattan* or *dry season* commences, although they are occasionally prevalent from this month to May. In December, January, and February, is the Harmattan season; and in these months the sea breeze sets in about noon, and blows with very moderate force from the W.S.W. and westward until sunset, when it dies away to a calm. During the night there is little or no wind, and the weather is extremely sultry and oppressive, with very heavy unwholesome dews. After daylight a light air springs up from the northward or N.N.E., which gradually increases to a moderate force, and continues until about 11 a.m., when it falls calm, and soon after is succeeded by the light westerly breeze. The Harmattan, however, sometimes blows steadily and without intermission from the N.E. quarter for several days together, especially about the new and full moon. It is at this season that the *smokes* prevail, and are exceedingly injurious to the European constitution. These smokes are so dense that it is impossible to see a cable's length from the ship for days together; and any vessels that may be in the offing, inward bound, have no resource but to anchor, and wait with patience for clearer weather. In March, April, and May, the weather is clear, with light land winds at daybreak, which gradually die away, and are succeeded by the W.S.W. breeze about 10 a.m.; and this breeze blows with moderate force during the remainder of the day and the greater part of the night. In these months the atmosphere is serene and clear, particularly during the nights, which are very fine indeed. The palm oil season commences in the early part of March; the oil becomes plentiful in April, and continues to be so until September, when it declines; and from October to March it is, properly speaking, out of season, although small quantities of it may be procured in these months.

In the foregoing remarks as to the seasons and climate, I beg to be understood as speaking of the New Calabar and Bonny Rivers only, and now proceed to consider the best means of preserving the health of the crews of vessels trading there. Masters of vessels should be on their guard against shipping plethoric or lusty men to go to the Oil Rivers of Africa. Drunkards are still worse subjects than these: for if a man undermines his constitution by intemperance in England, he cannot repair it in Africa. I have too frequently remarked that human skill is of little avail in saving the life of a drunkard, when once attacked with the African fever. The fact is, a drunkard is predisposed to sickness, and soon falls a victim to the climate. The plethoric or lusty man, if he has not tampered with his constitution, has rather a better chance; but should he fortunately recover from the fever, he is often annoyed with attacks of ague all the passage home, and does not recover his health until he arrives in England. Thin, raw-boned subjects are the best for the coast of Africa; and they should be selected from men who have made several voyages to the West Indies, as they are, in some degree, seasoned to a warm climate; and those that have never made voyages to a tropical climate should be decidedly rejected. To preserve the health of the crew, the vessel should be housed over as soon as possible after her arrival in the river. Plenty of mats should be procured, and a good, substantial, tight house be at once made, to shelter the crew, and preserve the vessel from the weather. Every care should be taken to make the house perfectly water-tight, as well for the comfort and health of the seamen, as for the advantage of working the palm oil in wet weather. An overstrained economy in the purchase of a few mats is highly reprehensible. The seamen will generally hang hammocks under the house; and, if well-sheltered from the weather, will enjoy better health than they would by sleeping below in the steam emitted from the oil. In these rivers it is presumed that the Kroumen do all out-duty required in the boats, &c.; for a European should not be allowed to put his foot over the side, either for the purpose of visiting or going ashore, even on ship's duty (unless unavoidable), as it infallibly leads to dissension and drunkenness, from the worst of spirits; and a drunken fit in Africa is the almost sure forerunner of sickness, and probably death.

All vessels should keep a sufficient quantity of English water on board for use in the country, as the Bonny and New Calabar water has an immense quantity of animalculæ, is very unpleasant to the palate, and injurious to the health. Cocoa is an excellent and nutritious article of diet; and the crew should be well supplied with yams, which is the only vegetable, excepting corn and plantains (the latter not plentiful), that can be procured in these rivers.

If the crew unavoidably get wet, they should immediately rub themselves thoroughly dry with coarse cloths, and put on dry clothes. The forecastle should be frequently cleaned out with a solution of chloride of lime, and the seamen's clothes and bedding kept well aired. Attending to these precautions will be found the best means of preserving health.

Here I may observe that fresh stock of all kinds is very scarce and very dear in these rivers, so that vessels bound to Bonny or New Calabar would do well by procuring their fresh stock and corn to windward, either on the Krou Coast, Frisco, Cape Lahou, the various settlements on the Gold Coast, or at a small village on the sea coast, near Cape St. Paul, called Dokko, or Occo. At these places stock of all kinds is abundant, and very cheap when obtained in barter.

CURRENT.—I have almost omitted putting the mariner upon his guard against the effect of the strong easterly current that runs from Terra Formosa to Old Calabar. This current runs with greater or less velocity almost throughout the year, except in or about the Harmattan season, when it occasionally sets to the westward and W.S.W. Vessels that have advanced much to the eastward of Terra Formosa, and cannot see Foché Point before night, should anchor, in order to prevent the effect of the current; but in squally weather or the wet season it may be as well to work to windward, heaving-to occasionally during the night, according to circumstances; 9 or 10 fathoms is quite close enough to stand in-shore in the night; when in 6 fathoms the surf can be very distinctly heard.

When once to leeward on this coast, getting up to windward again is attended with much trouble and difficulty. I may here remark, that too much attention cannot be paid to the lead upon any part of the coast of Africa, as the current frequently sets directly in upon the land; and from careful observation, upon the windward coast, I can confidently assert that the thermometer is no guide whatever in approaching the land. In more than 100 experiments upon the *surface* water, I could never detect any sensible difference in the temperature when sailing toward the land from no bottom into 45 and 40, and thence close in-shore into 14 or 15 fathoms on the Krou coast. In the dry season there is little difference hereabout in the temperature of the air and water; the former averaging 77° to 81° (in the shade), and the latter 74° or 75° of Fahrenheit.

DIRECTIONS.—*The Homeward Passage*, through the Bight of Biafra, presents no particular feature to the attention of the navigator, if I may except the strong N.E. currents that almost invariably prevail in it. All homeward bound vessels, that do not intend calling at Fernando Po, should use every possible exertion to pass to the westward of the island, as a good board may be then made to the southward on the starboard tack. Except in the Harmattan or tornado seasons, no advantage can be derived by standing close in-shore, as there are no land winds, and a near approach is, at any time, very dangerous, as the whole of the coast, from Camaroens to the Gaboon (except about Corisco), is generally bold-to, and the soundings in nowise wise to be depended on. On this part of the coast there is no trade, and the inhabitants are miserable naked savages. On getting to the southward of Prince's Island, the very excellent directions of Mr. Finlaison (given hereafter) may be followed with advantage.

Many navigators have remarked that on standing to the westward between Prince's and St. Thomas's, even when making a trifle of northing, the N.E. current has been found to diminish in strength as the vessel makes westing. Even so far to the southward as 3° South there is seldom any easting in the wind before passing the meridian of Greenwich.

Vessels bound to the northward should not attempt crossing the Equator to the eastward of 20° W. (the meridian of 21½° W. is to be preferred), and should then make a North or N. by W. course, to get into the N.W. trade wind, which having once fairly gained, the homeward navigation is generally well understood. In this route, after leaving the Guinea Current in the Bight of Biafra, the ship will gradually get into the Equatorial Current as she gets to the southward, and this current frequently runs with considerable velocity. On examining my journals, I find that, by good lunar observations and an excellent chronometer, I have, at various times, made the following differences to the *westward* of dead reckoning, in the run from St. Thomas's to longitude 20° West of Greenwich, between the parallels of 0° 35′ North, and 3° of *South* latitude. In April, 1830, the brig *Anne* was set 237 miles to the westward, and 78 miles to the northward of account in 20 days. In October and November, 1831, the barque *Severn* was set 240 miles to the westward, and 94 to the northward of account in 23 days. In October, 1833, the *Freeland* was set 246 miles to the westward, and 51 to the northward of account, in 20 days. In August, 1835, the same vessel was set 228 miles to the westward, and 43 to the northward, in 19 days. And in November and December, 1836, the brig *Caledonia* was set 373 miles to the westward, and 107 miles to the northward, in 18 days. But it may be observed that, in the latter vessel, I never crossed the Equator, but was generally 8 or 10 miles to the northward of it, until I crossed the meridian of 12° W. In the above runs I have occasionally, but rarely, found slight differences to the southward. When to the southward of the Equator, abreast of the Bight of Benin, I have always found a current running at least three-quarters of a mile an hour to the northward.

DIRECTIONS FOR SAILING FROM THE BIGHT OF BIAFRA TO SIERRA LEONE.

BY THE LATE MR. JAMES FINLAISON.

Ships bound from the Bight of Biafra to Sierra Leone, if from Calabar River, when the wind does not permit them to proceed by the N.W. of Fernando Po, may pass between that island and Camaroens River, when they will find a strong current setting to the southwrrd, apparently out of the River del Rey. After they have advanced to the southward of Fernando Po, they must endeavour to make all the southing and westing they can; passing either to the eastward or northward of Prince's Island, as winds will permit. On the East side of this island the current sets strongly to the southward, at the rate of 1½ knots: westward of Prince's Island the current generally sets strongly to the N.E. at the same rate.

Having arrived at the southward of Prince's Island, if the ship will lie no higher than W.N.W., tack immediately, and try to cross the Line; for, by so doing, you will keep out of the strong N.E. current [the *Guinea Current*] that sets towards the Bights of Benin and Biafra. After you have crossed the Line, you will find that you are nearly out of the easterly current. In the parallel of 1° South you will find the current set to the westward, at the rate of 1 mile an hour. In the month of May or June, when the sun has a high declination, the trade wind is fair to the southward, and you will not gain the regular breeze nearer than in 3° South. This breeze commences from S. by W. As you make westing, the wind will be found to haul more to the southward and eastward, and the current increases to the rate of 1½ knots in an hour, until you arrive as far to the westward as 15° West. On proceeding hence to Sierra Leone, come no farther to the eastward than 15° West, until you are as far to the northward as 8° 30′ N.; then you may steer boldly in for the cape. You will strike soundings in that parallel, in 14° 40′ W.; and as you approach the Cape the soundings will be found very irregular, from 20 fathoms to 12 at a cast. You will then be 7 leagues from the cape, and in the fair track of the river.

Having given these directions to our prize-masters, they generally made the passage from Fernando Po or Bonny in five weeks; merchant vessels have frequently been three months, by keeping in-shore.*

By Commander W. B. Oliver, R.N.

Conceiving that a shorter passage from the Bights, or Prince's Island to Sierra Leone, than that made by proceeding as recommended in the Book of Directions, to the southward of the Line, might be made by keeping to the northward, I determined to ascertain the fact; and though each time accompanied and retarded by a prize, made three unusually short passages, viz.—one from the River Bonny, anchoring at Prince's, and landing prisoners at St. Thomas, in 18 days; the other two in 13 days each from Prince's Island to Sierra Leone; and, on returning to England in Her Majesty's schooner, unaccompanied by a prize. Thirty-nine days having been the shortest route of the three prizes I sent up under the old directions from Benin and the Gaboon. I issued different directions to prize-masters; and, although not acted on, in absence from myself, I feel assured they would have proved, as they did in my company, an improvement on the old one; a copy of which Directions are as follows:—

Your first object will be to get to the southward, unless you can make a West course (*true*) without any northing; nor should you go to the larboard tack unless you can do so, or to avoid the land. Should the wind hang so much to the westward as to prevent making a good course on the larboard tack, pass to the eastward of Prince's or St. Thomas, or both, as you will sooner get out of the strong easterly current, but do not approach the land within 20 fathoms, day or night, and get frequent casts of the lead.

When to the westward of St. Thomas, and on or near the Line, steer W. ½ N., or W. by N., according as your noon sights give you a northerly set or not, until in the longitude of Cape Palmas, 7° 45′ W.; when steer, in the rainy season (May to September), N.W. by N.; in the other months, N.W., until in 13° West, the longitude of the western limit of the St. Anne Shoals: you may then make a true North course, sounding every 5 miles by night, or thick weather, and every 10 miles by day, from 6° N. to 8° N. If you reach the latter without striking soundings, it will prove that you have passed to the westward of the St. Anne Shoals; when keep away E. by N. by compass, to 8° 15′ N.; then steer E. by S. ½ S. (*East, true*), and you will make the high land of Sierra Leone; if by night, anchor on reaching 12 fathoms.

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* The reasons for proceeding as above described will be clearly understood by reference to the Remarks on Currents, page 27, in connection with those given above.

These instructions can only be acted on in a general way, as of course much depends on winds and currents; but I wish them to have full weight with any officer detached in a prize; and remember, the land about Sierra Leone should always be made to the southward of the Cape.

II.—PARTICULAR DESCRIPTION OF, AND DIRECTIONS FOR, THE WINDWARD COAST.

This coast was surveyed by Capt. Vidal, R.N., in H.M. ships *Etna* and *Raven*, in the year 1838. His survey of this coast, notorious for its unhealthiness, is 900 miles in extent, between Cape St. Anne and Cape Lopez.

The RIVER GALLINAS, with which we concluded our description of the coast in the Atlantic Memoir, is the boundary of the territory of SIERRA LEONE. It is famous as having been a great mart of the slave trade; near its mouth is the slave factory of the famous Pedro Blanco. The bar is not difficult to clear for coasters or boats, except during the tide races. It may be done by watching the swell. The coast here is very low and remarkably uniform, and for this reason three large baobab trees near the mouth of the Gallinas are an excellent landmark. At about 6 leagues south-eastward from the mouth of the Gallinas is that of another small river, the *Manna*, off which you may anchor in 9 or 8 fathoms: this mouth is shut up by the beach, on which there is always a great surf. It is sometimes called Roc-Manna, from the unusual circumstance of the shore being covered with blocks of black rocks. At 8 miles further eastward, passing several villages or factories, you find the little *River Sugury*, beyond which is the bight formed by *Cape Mount*, having from 10 to 14 fathoms of water, with a bottom of black mud.

From the River Gallinas to Cape Mount the coast is very low, and covered with trees. It has a fine sandy beach all the way. At 5 or 6 miles off are regular soundings, from 15 to 18 fathoms, mud and sand, until you arrive at Cape Mount. H.M.S. *Tartar*, Sir George Collier, anchored in 15 fathoms, muddy bottom, Cape Mount bearing S. by E., and a remarkable large clump of trees North. Merchantmen anchor further in, at 9 and 10 fathoms.

CAPE MOUNT, which may be seen at 9 or 10 leagues off, is a promontory of high hills, projecting into the sea, the highest peak being 1,066 feet above the sea; on each side the land is low, rather highest on the North side, with a flat sandy beach to the eastward. The Cape itself is distinguished by cliffs, which may be seen 4 leagues off. It is very remarkable, especially in coming from the westward, when it first makes like an island, and contrasts greatly with the low and uniform coast to the West of it.

To fall in with Cape Mount, you ought to keep in the latitude of 6° 40′, having, on account of the current which sets towards the shore, frequent recourse to the lead, when you think yourself near the land. In the night you may not approach nearer than to 26 fathoms, unless well acquainted.

To the westward of the Cape lies the Road, into which you may run, until the point of the Cape bears South and S. by E. There, in the summer season, that is between October and May, when the weather is generally fair, is anchorage in 9, 8, 7, and 6 fathoms, sandy ground; but it is more common to lie in 15, 14, 13, 12, and 10 fathoms, because the tornadoes and southerly winds sometimes make a very hollow sea. The watering place is near a large tree in front of the outer point of the cape; and here, in the fine season, you may take in water with great facility.

In coming ashore with your boat, you must bring a hawser with you, and fasten one end of it to the land, the other being dropped with the anchor to seaward, so that you may prevent the breakers by it; for you run directly against the flat beach below the town, without any shelter of banks or cliffs; in the morning, you may easily get ashore with smooth water.

To the northward of Cape Mount there is a river of the same name, which has been celebrated for its trade. There is 7 feet water on the bar at low water, and 13 at high water; the current runs very strongly out, and the best time for crossing the narrow bar is at half-flood. Between the cape and the entrance of the river there is good riding in the bay, during fine weather, in from 15 to 6 fathoms; but from 14 to 12 fathoms should be preferred in the rainy season, and even there it is hazardous, unless provided with the best ground tackle; for southerly and S.W. winds, in that season, set into the bight with a tremendous sea and heavy gusts, which raise a violent surf on the shore, that may be heard at a distance.

Those approaching from the westward by night, without a previous sight of land, must take the precaution of sounding in time, in order to avoid the danger arising from the velocity of the current. As there are 15 fathoms close inshore, you should not advance by dark nearer than in 20 or 25 fathoms. The same precaution should be taken during the *Harmattan*, when the sun is obscured by haze for days together, and the current varies.

LIBERIA.—The COLONIZATION SOCIETY of the United States of North America, with the view of relieving themselves from the presence of emancipated Negroes, took measures, about the year 1817, for founding a colony of free blacks on the western coast of Africa. After several unsuccessful attempts to obtain a settlement, they commenced upon Sherboro' Island. A worse place could not have been selected; for, soon after landing, the insalubrity of this most unwholesome place began to show its dreadful effects on the settlers. These consisted of twelve white men and a great number of coloured people. Eleven out of the twelve white men fell victims to the climate in a very few months; and the remaining one left in June, 1820, and most of the coloured settlers followed to Sierra Leone.

In 1821, settlers again arrived and established themselves on about 10 acres on the banks of the River Mesurado, where the settlement of *Monrovia* was founded. They extended their footing on both sides of this river, with much opposition from the natives, the war with whom was continued until the latter part of 1823, when an officer and twenty-five men from a vessel of war volunteered to protect them; but it is a lamentable fact, that the whole of these men fell victims to their hardships, and the baleful effects of the climate. In 1824, the settlers turned their attention to commerce, and still extended their operations.

Perfect or uninterrupted tranquillity cannot, however, be expected without compact and adequate means of protection; and it appears that, in 1835, the colonists were attacked by some tribes, who stormed a frontier settlement, *Fort Cresson* at Bassa, and massacred a number of inhabitants. At the same time, *Edina*, another settlement, was likewise threatened.

The original extent of territory, called Liberia, reached from Cape Mesurado south-eastwards, to the Junk River, a distance on the line of coast of about 20 miles; and about 10 miles in an opposite direction, N.W., to a place called Digby (not 120 miles, as otherwise stated); and from the coast inland it reached about 15 miles. It also included about 4 or 5 miles on the right bank of the River St. John, and a small detached situation on Cape Mount. The two last-mentioned places were purchased, and were, in fact, the only parts of the coast ever occupied by the strangers with the consent of the natives.

The present extent of Liberia is about 600 miles along the coast line, and to about 100 miles into the interior, its limits being the Shebar River on the N.W. to the San Pedro River, 78 miles eastward of Cape Palmas. For political purposes the republic is divided into four counties, Montserrado, Grand Bassa, Sinou, and Maryland. The ports of entry are *Robertsport* on Grand Cape Mount River, *Monrovia*, the capital at Cape Mesurado; *Marshall*, on Junk River, in Montserrado County; *Greenville*, on Sinou River; and *Harper*, at Cape Palmas, in Maryland County. The population has been variously stated at from 250 to 500,000, including 16,000 Americo-Liberians, who compose almost the only civilized portion of the inhabitants. The government is on the model of that of the United States.*

Palm oil is the principal article of export from the republic; the supply is steadily increasing, and may be increased almost indefinitely. Camwood is again being received from the interior. Ivory is now obtained in very small quantities.

A large portion of the trade of the republic, especially in respect to British merchants, is carried on directly with the aboriginal inhabitants of the country, at numerous trading stations, where no customhouse is established. Foreign vessels arriving on the Liberian coast, and intending to engage in this coastwise trade, enter at some one of the ports of entry, and pay the customary import duty on their entire cargoes. Upon which they obtain a general permit, and a license to trade and land their cargoes at any part of the coast designated. But it is said that much fraud has thus been practised on the revenue.†

From the circumstance of the colony being formed of emancipated slaves, or from liberated negroes, party spirit has so interwoven itself in most previous accounts that the absolute truth was most difficult to arrive at. But there now can be no doubt that the young republic will add its important share to commerce in the form of cotton, coffee, palm oil, corn, wood, and many dye-woods, in large quantities.

CAPE MESURADO (or **Montserrado**) lies about 14 leagues S.E. by S. from Cape Mount. Hence its latitude is 6° 19′ N., in longitude 10° 49′. Between the two Capes the coast is very low, with a white sandy beach, above which the land is covered with trees of varying colours. About 3 leagues to the northward of the cape is the *River of St. Paul*, navigable for boats only; but ships may lie off it at pleasure, in from 16 to 6 fathoms, good ground. The depth of 10 fathoms is nearly two miles from shore.

Here it may be repeated, that from Cape Mount to Cape Mesurado, as well as upon the coast from Cape St. Anne to Cape Mount, the rains begin with May, and continue till October, accompanied with great thunder and lightning, and furious gusts of wind from the north-west quarter: during that time the sea sets so hard to the N.E. along the coast, and with such mountainous billows, that it is impossible to approach the shore; so that ships which, between July and September, happen to fall below Cape Mount, cannot, without, great difficulty, get about to the South.

Cape Mesurado, though not so high as Cape Mount, is an elevated promontory, almost perpendicular on the North side, but with a gradual declivity toward the sea on the South. There are regular soundings, of 20 to 15 fathoms, muddy bottom, at 8 miles off-shore, along which the current sets strongly. At two or three miles offshore, with the Cape S.E. by S., is a depth of 15 to 10 fathoms, muddy bottom, and a common anchorage. With the Cape bearing N.E., the land appears like an island, with trees rising out of the water to the North; and at 7 leagues off it appears in its insular form, the land on each side being very low.

In the winter months here, as at Cape Mount, vessels should lie well out, on account of the heavy sea in the bay, and the southerly winds, which would otherwise render it very difficult to get out to windward. To anchor at the Cape in the rainy season, bring the Mount to bear S.E., distance off-shore 3 or 3½ miles, and come-to in 14 fathoms of water. A very tall tree, easily recognisable, surmounts the Cape.

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* See Journal Society of Arts, May 23, 1862, a paper read by Gerard Ralston, Consul-General for Liberia.

† Report of Mr. Roberts, H. B. M. Consul, 1859.

Commander Lynch, U.S.N., says, "The pitch of Cape Mesurado is gently rounded; but its face is abrupt, and would present a rugged appearance were it not covered with a mantle of the richest green I have ever looked upon. Except a very narrow strip of beach, all is one mass of foliage, tangled vines, and shrubbery beneath, but above a dense growth of trees, becoming more and more lofty, until those on the summit rear their heads above them and half conceal the lighthouse, an indifferent frame building, stained and defaced by the weather."

The *lighthouse* shows a light (the character of which, however, is not properly announced) at an elevation of 240 feet, and consequently ought to be visible at 15 miles off.

The anchorage is an open one; but the winds rarely blow fresh from the shore, and the only danger to shipping is a heavy sea, which sometimes come tumbling in without the slightest premonition. The ridge of high land, the rounded extremes of which forms the Cape, trends inland, in a diagonal line from the coast; and on a depression of that ridge, about half a mile from the lighthouse, the principal part of the town is built.

MONROVIA, the capital of Liberia, contains about 300 houses and 2,000 inhabitants, and is built, as just stated, on a depression of the ridge which sweeps inland from the Cape. About midway the length of the principal street, the land swells up like an earth wave, and sinks immediately down the street, which, crossing the summit, follows the declivity. On the summit is Fort Hill, which comands the suburbs, the river, and the inner harbour, and moreover from it is a very fine view. It is the outlet of the products of the St. Paul to the North, to which it is connected by *Stockton Creek.* The settlements of *Caldwell,* &c., on the St. Paul, showed every indication of comfort and prosperity; far more so than in Monrovia.

"The city is erected on an eminence, which you can ascend from the shore by either of three or four rugged pathways, past the church, a hotel, and the president's house, until you find yourself in some place, which one tries to realise into the fact of a street. But it cannot be done. Houses are jotted down as if they had been dropped from the sky; flowers of the richest hue are in the gardens; but there is a stillness with an absence of spirit or business in the place, that made me at first wonder where I was. I looked up at the president's house, the chilliest, most prison looking building at which I have ever gazed; then up at the lighthouse, a mammoth pepper-caster, then down the street, yet no sign of life was anywhere." *

A new college was completed in 1861, a fine edifice built and endowed from funds sent from Boston, United States.

After having doubled Cape Mesurado, another cape is passed almost as high as the cape itself, and which forms the South point of the peninsula of Mesurado. It is called *False Cape Mesurado.* Hence to the River Junk the coast is perfectly clear. It is green, wooded, and in some places moderately high. In the neighbourhood of *Red Junk,* a river between Mesurado and the River Junk, there is land as high and wooded as those near Mesurado.

The RIVER JUNK is about 10 leagues S.E. by E. from Cape Mesurado. It may be found by means of a remarkable saddle land, 1,071 feet high, which stands at about 10 miles up the country, to the N.E. In 15 fathoms of water, clear sandy ground, you may anchor during the rains, with the river's mouth N.N.E. and the Saddle N.E., at 4 miles off-shore. You may also anchor in fine weather at 2¼ or 3 miles from shore, similar bottom, in 12 fathoms, with the mouth of the river North, and the Saddle N.E. It is to be recollected that in the rainy season the wind sets strong toward shore, and the greater distance is therefore required.

There are some sunken rocks on each side of the river's mouth, which boats may avoid by keeping in mid-channel. A small American colony, dependent on Liberia, is established on the left bank of the river. After clearing the bar, keep to the port side, steering to the fishermen's tree, or where they have constructed their cabins. Provisions may also be obtained from the colony on the right shore. Good fresh water may be obtained here. There is a small reef of 14 feet, a mile from shore, at 6 miles to the westward from the mouth of the river. At a mile from the mouth of the Junk is that of the *Little Bassa River*, which must not be confounded with the place of that name 9 or 10 miles lower down.*

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* Impressions of Western Africa, by Thos. J. Hutchinson, H.B.M. Consul for the Bight of Biafra, etc., 1858, p. 45.

Bassa.—From the River Junk to PICANINY RIVER, or LITTLE BASSA, a distance of about 3½ leagues, the coast trends to the S.E., consisting of red and white cliffs, apparently land-slips. This place is known by the house of the chief, which is very large and remarkable. An American or Liberian colony exists here. On the coast before the town is a dangerous reef, which thence extends 5 miles to the south-eastward, and has foul ground near it; so that no vessel hereabout should anchor in less than 16 fathoms, for in a less depth the bottom is rocky.

From Picaniny Bassa to the *Nine Trees*,† and *Santree* or *Bullam Town*, the distance is 2½ leagues; beyond these, to the eastward, is the River of St. John. The mouth of this river makes the *Grand Bassa*, or *Bissaw Beach*, which trends in a South direction, nearly 2 miles, to *Bassa.*

The Nine Trees constitute a singular and excellent mark for this coast. Mr. Norris said that nothing could be more remarkable than their appearance; and what rendered them more so was their leaning rather to the S.W., which is contrary to most of the trees on the coast, as they generally lean toward the N.W. But M. Bouet-Willaumez says that these trees are a good mark only when close in-shore near Grand Bassa, as they are scarcely distinguishable from other trees, and do not appear regular except seen from the bay.

The anchorage off Picaniny Bassa is with these trees bearing S.E. by E., and the large house of the chief, before mentioned, N.E. by E. That of Grand Bassa, in the rainy season, is with the Nine Trees North, about 6 miles distant (as above), where you will lie in 15½ fathoms, bottom of very rough blue marl. In the dry season the anchorage is nearer shore, in 12 fathoms.

The Nine Trees stand on an eminence above the town of Bullam, a league or more to the westward of St. John's River, which river limits the Grain Coast on the West.

THE GRAIN OR PEPPER COAST.

The designation of the "Grain" Coast is derived from its being the source from whence the Grains of Paradise, Guinea Grains, or Malaguetta ‡ Pepper is procured. This wholesome spice is chiefly used in England in veterinary medicines, and to give an artificial strength to spirits, wine, beer, and vinegar; though these latter uses are contrary to law. The seed is the produce of an amomum, of which there are several species, but the exact number of which is not known; one has recently been made known by Dr. Daniell, and called Amomum Danielli. About from 15,000 to 19,000 lbs. annually pay duty in England. It is brought over in casks.

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* "All these Bassas, great and little," says M. Boüet-Willaumez, "were formerly Norman establishments, as is still evident by the names which still exist as given by those hardy navigators along all this coast. The words Great and Little Bassas, Great and Little Dieppe (Grand et Petit), have been retained, in spite of the half-English half-Spanish dialect which has been formed on the West Coast of Africa. The old remembrances of France, also, rendered easy the acquisition of the lands about Fishermen's River, which was done in 1842, for the purpose of a depot for refitting and refreshment for ships."

† Formerly known as the *Seven Trees.*

‡ Spelt variously; Malagetta, Meleguetta, Melegeta.

The ST. JOHN'S RIVER, as before stated, is considered as the boundary of the Grain Coast. It was visited by Comm. Lynch, U.S.N., in the beginning of 1853, who says of it :—

Within the bar are concentrated the waters of three rivers, the *Mecklin*, flowing from the North; the *St. John*, from the N.E.; and the *Benson River*, from the East. This great body of accumulated water is forced through a passage narrower than the principal stream; and when the tide is ebb, and the wind blows fresh from the shore, there is drawn across it a line of terrific breakers. At this season, however, the winds are ordinarily light; and with a skilful pilot the bar can be passed in safety.

Buchanan.—The Benson River pours in its tribute opposite to *Edina*, and on the West side of the junction is the flourishing town of *Buchanan.*[*] On the river adjoining the town there was a steam saw mill in operation; and in the cove beyond it one small vessel was hauled up for repairs, and two others were anchored in the stream. The streets of Buchanan are wide, and parallel with the beach.

The St. John River is as wide as would be the united streams of the Mecklin and the Benson. At 3 miles up it is separated into two branches by *Factory Island.* For 30 to 50 miles from the sea it is one uninterrupted camwood forest, and very large quantities are cut for fuel and export. The settlements on the St. John appear to be all flourishing.

Cresson, an establishment above alluded to, formed through the energetic measures of the philanthropic Mr. Cresson, is about 2 miles S.E. of the mouth of the St. John. It is called Bassa Cove and Fish Town on the charts. It was founded on the peace principles; but the massacre in 1835 demonstrates the folly of this amid such a people. It would appear that it has great capabilities as a harbour.

GRAND BASSA.—The town of GRAND BASSA, with its anchorage, has been already noticed. The same sort of provisions and resources may be found here as at Mesurada. *Bassa Cove*, 2½ miles to South, on which *Fish Town* is seated, has from 6 to 2 fathoms of water. This cove is very small, but very safe. It is bounded on the West by two large rocks above water, between which and the shore a vessel drawing 14 feet may moor, in case of emergency.[†]

The best marks for Grand Bassa are the large houses built in the European style by the American colonists. The governor's house, over which floats a flag, nearly American, is the best point of recognition at a long distance. Approaching the place, the other houses became apparent; and a large umbrella-shaped tree is seen surmounting them all. You may anchor off the government house. There are some black rocks to the N.W. of the bar. The River St. John separates the colony into two parts; Bassa to the right, and *Edina* to the left or West. The river is also divided into three principal branches; one of which is called the *Benson*, and almost insulates Bassa; another runs to N.N.W., and is called the *Mecklin* or *Mackland.*

A large and conspicuous rock, called *Tobocannee Rock*, lies about 2 miles from shore, at the distance of 6½ miles S.E. ¾ S. from the point of Bassa Cove; and from it extends a reef under water, 2 leagues to the westward, and nearly parallel with the coast. On the shore, within this rock and reef, is Tobocannee (or Tobacconee), which may be known by a clump of trees spreading over it. There is a passage for small trading boats, but no larger vessels, between the reef and land.

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[*] This settlement was founded by the New York and Pennsylvanian Colonization Society, in 1836, and consists of the migrants who escaped the massacre at Port Cresson in that year. In 1838 the population was 200, and in 1853 it was 600, mustering 100 fighting men. It is the port of entry for the Bassa county of Liberia.

[†] Of these rocks the westernmost is called *Yellow Hill*, the other *Andrew Hardman*. In the year 1761, when the *Amethyste*, a French frigate, made great havoc upon the coast, the commander of the brig *Snapper*, of Liverpool, ran his vessel within them, stript and moored there, and continued trading in safety, while the small craft of the enemy, then at anchor in the offing, dared not to attack him.

The ground all the way hence to CAPE PALMAS, an extent of 50 leagues is generally foul and rocky. Small working chain cables are, therefore, here of essential use, particularly to vessels that must come to at the different places of trade. Such vessels most conveniently commence to windward, on account of the current, which sets along the coast to the S.E., and thus much time and expense are saved.

After passing Tobocannee Rock, outside of which is another rock awash, you will plainly see the trees of Tobocannee, and can then bear up for the anchorage of New Sesters, the principal mark for which is a group of tolerably high trees. A good landmark for this part is *Tobacco Mount*, 881 feet high. Its summit is composed of two or three hummocks. It is on the parallel of New Sesters, and 9 miles inland.

There are several villages at this point of *New Sesters*, or *Young Sesters*, or *Neetoo*, once active slave marts. Continuing along the reef, you pass *Trade Town*, where some large magazines, built of straw, stand near the houses. Then follows *Great* and *Little Culloh*, or *Currow*, and *Tembo*. The line of the reefs, which is interrupted before these villages, reappears to the South of *Manna*, the large black rocks of which are surrounded by shoals reaching 2 large miles off shore. When abreast of Tembo you will be able to make out, to S.E., the magazines and straw huts of the River Cestos. It may also be made out by two large trees, which stand on the left bank of that river, one of which is very high and spreading at the top. When on the parallel of this tree, to the West of it, you may anchor in 6 to 8 fathoms, having the *Manna Rocks* between North and N.N.W., avoiding to choose a berth to the South of the parallel of the tree.

GRAND CESTOS RIVER.—The entrance of the RIVER SESTROS, or *Grand Cestos*, lies in about lat. 5° 26′, long. 9° 34′, and is therefore about 20 leagues from Grand Bassa Point. The mouth of the river is covered with rocks. of which several are above water, and 2 miles from shore. Here you may anchor in 10 fathoms, muddy bottom. The river is navigable for boats as far as the *King's Town*, the watering place in the rainy season, and more than 4 leagues from the entrance.

Grand Cestos River offers the best position for a trading colony. It has been the site of the palm oil factories of the traders on that part of the coast; its bar affords 11 to 12 feet water. The roadstead for vessels gives better shelter than is to be found on a very long line ef coast; so much so, that a vessel of 149 tons burthen was once hove down and coppered there.. Palm oil in considerable quantity is produced in the neighbourhood. From the experience of the persons employed at the factories there, the climate appears, for the coast of Africa, healthy.

At the mouth of the Grand Cestos was formerly the Norman establishment of Grand Dieppe; the trees and village are on the left or East bank of the river, the village being hidden by the wood. In some positions, the entrance may be distinguished by three hillocks, two of which are much larger than the third. The starboard point, on entering, terminates in a chain of reefs, which extend a long distance to the S.E., but you must close with them to enter the deepest part of the channel. On the opposite side are some sandbanks, which frequently break. The outermost rock on the starboard side is one of 12 feet, called *Spence's Rock*, but to the S.E. of this is one of less than 11 feet. These are the more dangerous, inasmuch as that they do not always break.

SANGWIN.—The town of Sangwin is 5½ leagues to the S.E. from the Grand Cestos. It may be known by a large rock, called *Bai Yah*, or the *Devil's Rock*, with a bushy clump on the top, and lying at 2 miles from shore, to the southward of which there is anchorage. Between the River Cestos and Sangwin, at 2½ leagues from the former, is *Red Cestos*, known by some rocks which lie off it, and a large solitary palm tree on the point. Between the rocks and beach you may anchor. Provisions and firewood may be got at Sangwin. *Baffou Bay*, which follows, is well sheltered from the South and S.E. The natives here have a bad reputation. *Baffou* may be known by having no large trees about it; some large rocks lie off the point, to the northward of which there is anchorage, in sandy ground.

Settra Krou, a very large town on the beach, is 12 leagues S.E. ½ E. from Sangwin. The greatest part of the ground between is foul, but a few spots are fit for anchorage.* *Tussou*, or *Tahou*, is known by three rocks lying off it, between which and the shore you may anchor at 1 mile off. One of these rocks is pierced through in a singular manner. *Battoa*, or *Bootou*,† appears, at a distance, like an island, and is known by its high land (266 feet) and bushy trees.

SINOU RIVER is, or was, known by a large single tree standing upon the pitch of the cape, to the eastward of which are some breakers. Off this you may anchor in 16 fathoms, sand and stones, at 5 miles from the shore. Sinou makes like a long bay, extending North and South. Commander Lynch says of it (in 1853):—The anchorage is an exposed one for large vessels, but smaller ones find a partial shelter from the S.W. winds and its accompanying heavy sea behind Blobarre (Bloo Bara) Point. The Sinou, a small but placid river, was selected, about eighteen years ago, by colonists from Mississippi and Louisiana, with a few from South Carolina, who founded the town of *Greenville*, on the right bank, just above the river's mouth. It is the port of entry for the Sinou County.

Greenville presents an attractive appearance from the sea. Directly abreast of it the shore curves inwards, and then stretches to the North a long line of yellow beach, fringed with a deep forest. To the South are two bays; at the N.W. extremity of the northernmost is the promontory of Bloobarre, a broad, high rock, its surface bare and smooth to the summit, which is covered with luxuriant foliage. Outside this is a ledge of detached rocks, covered with gulls at low water, and between is the bar. Above Greenville, which is regularly laid out, and by far the neatest settlement seen by Commander Lynch, are the settlements of *Rossville* and *Readville*, subject to inundations. Rice is the principal food crop; palm oil being the chief export. Hereabout the easterly current sets, very commonly, 2 miles and more in the hour.

SETTRA KROU, &c.—Proceeding along the coast, a long, flat, black rock will be seen ahead; it is called the *Krou Rock*, and is the largest and outermost of the rocks around it; it may be passed close-to. To the N.E. of it is the village of *Little Krou*, and to the E. by S. the village of *Settra Krou*. Large, stout-built houses, used as European factories, stand in the middle of the latter village, and serve to distinguish it. The villages of *Kroubah*, and *Great* and *Little Nanna Krou*, succeed. All these villages are occupied by that exceedingly useful race, the Kroumen, or natives of the Krou coast. Off here the bank of soundings is considerably wider than it is either West or East of it; the 100 fathoms line being here fully 31 miles offshore, instead of 15 or 20 miles as elsewhere.

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* Lieutenant Bold says—"It is on this part of the coast that you may hire men to assist the ship's crew in the more laborious occupations of trade: they are strong, willing, hard-working people, and strongly recommended to the oil vessels bound to leeward, as being extremely serviceable in cases of emergency, or sickness of their own men. They are faithful to you in a strange country, and content with a small *dash*, or present, on quitting at Prince's or St. Thomas's Islands, whence they commonly find conveyance back to the coast."—These are the *Kroumen* already noticed by Captain Midgley, and for a further account of them, see the Journal of the Royal Geographical Society, Vol. XII., 1842, pp. 205-6.

† M. de Bouët-Willaumez calls this Grand Butteau and Little Butteau (great or little *butte* or mountain), deriving the name from the old Norman appellation. The term, if correct, must be derived from the hill mentioned. It was here that, in 1842, the French commander obtained the land between the river (Fishermen's River, or Grand Bootou or Butteau), and the Tahou for the French nation, in case it should have been thought advisable to found a depot here.

Krou Settra is readily known, in clear weather, by the high and bare trees, which rise like masts of ships laid up. Off this place you may anchor in 16 or 15 fathoms, good sandy ground; but those bound to it must carefully avoid a dangerous reef, extending 3½ miles from shore, and over which the sea breaks once in every 15 or 20 minutes. There are 6 fathoms close to it; 14 or 15 fathoms will carry you without it; but, by advancing to 12, you may be aground. Krou Settra and the shoal, in a line, bear E.N.E. At 6 miles from this shoal is the *Swallow Rock*, off Wappou, which is likewise covered. This shoal bears nearly S.W. 2¼ miles from the town, and S.S.W. 3 miles from a large rock or islet, westward of Wappou, called *Totwarah* or *Flat Isle*. *Wappee*, or *Wappou*, is known by a single tree on the beach. There were two villages, Great and Little Wappee, the former has been destroyed.

Neefoo or **Niffou** is 4 miles south-eastward of Wappou; it consists of *Little*, *Middle*, and *Great Neefoo*; *Drou*, or *Droo*, to the West of the *Rio Dos Escravos*, or Slave's River, is 5 miles beyond Niffou. Drou has been a place of good trade for ivory and Malgatte pepper; but unless a boat is well manned and armed, it is dangerous to trade here. A rock lies off the mouth of the river, which may be entered by passing to the northward. *Baddou*, or the *Four Towns*, lies on the beach; the same caution is to be observed here as with the people of Drou. The coast about it is entirely foul.

LITTLE and GRAND SESTERS (or **Sestros**) were formerly the Petit and Grand Paris of the Dieppe traders. The first is 8 or 9 miles from Baddou. The river on which it stands flows through a fertile plain, richly planted with palm trees. The second is divided from it by *Sesters Point*, which separates the plains. It is planted with some umbrella-topped trees, one of which is remarkable, and will point out the village. A mile off the point is a large black rock, called *The Carpenter*. Grand Sesters is on the East bank of the river of the same name. You may anchor off the Carpenter, in 12 fathoms.

The town of *Garraway* is about 17 miles to the south-eastward of Grand Sesters. At 12 miles there is a remarkable ridge of trees, a good landmark. Garraway may be known by three hills on the West, with a clump of trees on its extreme southern point. You may anchor off it, to the southward, about 4 miles from shore, in 20 or 24 fathoms, good ground; but the coast off it is bordered by a reef. Garraway, and its road and river, were surveyed by MM. Bouet-Willaumez and De Langle; but although the little river is easy of entrance for boats, there are so few resources to be obtained that it will be useless any further to describe the place.

It is high water, on full and change, at $5^h 45^m$; rise, 2½ feet. There are several villages at Garraway, and it may be recognised by a very distinct clump of trees called Blackwill Trees, standing on a high hummock.

At 3 leagues S.E. from Garraway is the little negro town called *Rock Town*, within a point covered with trees, and which received its name from a dangerous reef of rocks, extending from it to the distance of 3 or 4 miles. Some of the rocks are above water. Between this place and the cape to the eastward is *Cape Palmas Little Town*. The large town is near the pitch of the cape. It has been recommended to those passing not to stand nearer to the coast hereabout than in 24 fathoms, the soundings within that depth being very irregular and the bottom foul.

In leaving the coast of Garraway, to double Cape Palmas, there are two routes to follow. The first is to pass between Fish Town and the North end of the reefs extending E.N.E. of the Coley Rock. The depth in the narrowest part of this channel is 7 to 10 fathoms, rocky bottom; the width 1½ mile. The current runs to E.S.E. at the rate of 2 knots, and often more, keeping the same velocity past Rock Town Point and Cape Palmas. This is by much the shortest route, and may be easily done while daylight lasts. But if it is intended to go South of the Coley Rock, on quitting Garraway make away for the West, in order to bear up against the prevalent East current and the West and S.W. winds, and attain the depth of 90 fathoms before you bear off for the eastward, and must wait for daylight to pass Cape Palmas. In case of any doubt whatever, anchor without hesitation. *Fish Town* and *Rock Town* are built on two points, which form three slender bays, and terminate in black rocky heads. The heights are crowned with palm trees, and these and the woods give a very picturesque and varied aspect to the land.

CAPE PALMAS, &c.—Cape Palmas is the southernmost land of all the coast of Guinea, and its extremity lies in lat. 4° 22′ N., long. 7° 44′ 16″ W. Captain John Lok, in 1554, the first Englishman who sailed along it, described it as "*Cape de las Palmas*, a fair high land; but having on the eastern side some low places by the shore, which look like red cliffs, with white streaks, resembling highways, each the length of a cable." It has been latterly described as a land moderately high, thickly wooded, with small hillocks and cliffs toward the sea, with red clay fissures resembling tracks or roads, and a large mud-walled town on the eastern elevation. The natives are described as poor and inoffensive, and live principally by fishing; though they sometimes bring off to vessels a small quantity of ivory and malagette pepper.

Lighthouse.—On the western extremity of the Cape Palmas, 74 feet high, is a lighthouse, showing a *fixed* light.

To the southward is a narrow bluff island called *Russwoun Island.*

At about 3 miles to the westward of Rocktown Point, and extending in nearly a *true* East and West direction, is the *Cape Shoal.* Between it and the shore are 13 fathoms of water; and within it, near the latter, small vessels may anchor; but it is to be noticed that the current here sets with great velocity to the S.E. At about 2 leagues to the West of the Cape Shoal is the rock called *Coley's Rock*, which lies, with the pitch of Cape Palmas, E. 22° S., 3¼ leagues, and the trees to the West of Garraway, N. 5° W., 13 miles.* The least depth over it is from 6 to 10 feet, and it breaks in high winds: it tapers down to 7 fathoms all round, as close as you can chuck a biscuit, and near it are 13 fathoms. The Cape Shoal is very dangerou; but having deep water all round, a fleet may pass between it and the land; but it must be remembered that the current sets strongly to the S.E.

Harper.—There is a Liberian establishment, like that at Mesurado, Grand Bassa, &c., on the point of the Cape. It is called *Harper*, and provisions, wood, water, &c., may be got. You may pass close to the point, and anchor in front of the houses.

TRADE between GRAND BASSA and CAPE PALMAS.—The mode of traffic between these places is that called the round trade: the *round* being a nominal valuation, signifying one of every article employed in barter, for a tooth, &c. It is described by Lieutenant Bold (p. 46). The chief products are ivory, malagette pepper, and rice. The latter is excellent in quality; but not, in general, being properly cleaned, is in the less demand.

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* This rock was discovered by Capt. Coley, of the ship *Queen*, of London, in 1795, who stated it to lie with two high trees above Garraway, bearing North, 5 leagues, and the pitch of Cape Palmas E.N.E. 6 leagues. But it has been shown by Capt. Adams that it certainly must lie nearer to the land; and this has since been confirmed. Captain Thomas Hamlin, in the brig *George IV.*, from traversing past Cape Palmas, in the evening and night of the 13th of January, 1825, was of opinion that it is connected by a ridge or a bank with the Cape Shoal.

ATHOLE ROCK.—There appears to be, to the eastward of Cape Palmas, another sunken rock, upon which H.M.S. *Athole* struck, on the 16th of December, 1830. The ship was running along shore, in 12 fathoms, at 3 or 4 miles from the land, and at 1½ mile from the outer breakers. On each side was a depth of 10 fathoms. From the rock the bearings were, the great town of Cape Palmas N.W. westerly, a round rock above water E. by N., and a clump of trees on the eastern extremity of the land E. ½ S. (Variation, 19° W.)

III.—THE IVORY OR TEETH COAST, FROM CAPE PALMAS TO CAPE LAHOU.

The chief places of trade are Cavally River, Bassa, Wappou, Bereby, Tahou, St. Andrew's Bay, Lagos River, Kotrou, and the town of Lahou. The mode of barter is the *round trade*, already noticed. The places in the neighbourhood of Cape Palmas abound in malagette pepper, rice, and grain. At the other places the chief commodities are ivory and palm oil; and of these, the best stock has been commonly found at St. Andrew's and Lagos River.

In the offing, the winds, in the fine season, are generally from between the West and S.W. In the rainy season they are generally from S.S.W. The current to the eastward, 2 miles and 2½ miles in the hour.

CAVALLY.—At 6½ miles' distance from Cape Palmas is a little town called *Gurrarwah*, *Gruway*, or *Grewa*. In front of it is a reef, which plainly shows when the breeze has set in. After passing this point and village, you will see the first of the villages, called *Cavally*, distinguished by the name of *Little* or *Half Cavally*, and then other groups of villages of the same name; then the River Cavally, which will be made out when it bears North.

The Cavally River may be entered to procure Kroumen, or, still better, anchor off it. Provisions may be obtained at the villages, but communication is difficult. One Cavally village is situate on the eastern bank, and near the entrance of the river, on the opposite side of which is a reef extending seaward more than 1½ mile. There is good anchorage off the river in 20 fathoms. The river is navigable for boats. This place may be known by the two points at the river's mouth, which is wide and barred; though, in coming from the westward, you will not perceive the river till you are nearly to the S.E. of it.

From Cavally the coast trends nearly *true* East to *Growa*, known by four or five rocks before it, some of which are breakers. The land all along is even, but appears to double when you are near Growa; then, having passed two hummocks close to each other on the beach, you may see a low, flat point, projecting into the sea, which breaks very much upon it: this is *Tabou Point*, about 2 leagues E.S.E. from Growa. You may ride before the town of Growa in 21 and 22 fathoms, good ground, and off Tabou Point in 15 fathoms, at 2 miles off.

Between Tabou Point and the town of *Tahou* the land is considerably higher than that to the westward, and is varied with many hummocks, particularly within 6 leagues of Tahou, where it is higher, near the coast, than any other seen between this and Cape Mount.

At the distance of 7 miles East from Tabou Point are the town and Point of *Bassa*, off which several reefs extend to the eastward, nearly a mile off shore. The coast then takes an E. by S. direction for 5 leagues to *Half Bereby* or *Biriby*, between which and the *River Bereby*, or *Nahno*, 3 leagues E.N.E., the coast is lined with reefs, extending upwards of a mile from shore. At 5 miles from Half Bereby, on the outer edge of this reef, is *Devil's Rock*, of a whitish colour.

Bereby, or *Kadahboo*, is 3 leagues westward of Tahou. It is situate on the margin of a bay, on which boats can generally land, as there is a projecting point which breaks off the sea; there is also a rock in the bay, called the *Katum Rock*, or, as it has sometimes been called, the Devil's Rock.

TAHOU is a considerable town, 3½ leagues West of the *Rio S. Pedro*. Its shore is rocky, but you may find good riding before it in from 14 to 12 fathoms, only taking care not to approach too near the rocks. Off it is the *Broone Rock*, which is black, and visible at a distance. At half a mile W.S.W. of it is another reef, which breaks 2 miles off shore.

The RIVER SAN PEDRO falls into the small *Bay of San Pedro*, at its East sides the West limits being a point which shelters the bay during the dry season. The river was examined by Lieutenant Fleuriot-de-Langle, in March, 1844, who named the projecting West point, *Point du Minou.* A little to the West of it are four rocks, three of which were called the *Three Caravelles*, the fourth, the *Malouine.* These break as will be seen, in coming from the West, and the entrance of the river is masked by Point Minou. It must be brought to bear N.W. to open it. It is high water at $6^h\ 4^m$; rise, 6 feet 6 inches. The village is on the beach between the Caravelles and Point Minou; the entrance has a depth of 10 feet at half tide. The current outward is very rapid, but it was said that it might be ascended for several days. Wood and water may be got here.

This river is the boundary of the Liberian Republic.

Beyond San Pedro the coast rises abruptly from the sea to hills of a height of 350 to 517 feet. *Highland River* appears as if it might be frequented.

ST. ANDREW'S BAY.—This bay, as we have noticed, lies 16 leagues East from Tahou. It is easily known by the *High Land of Drewin*, to the westward of it, the coast of which is very rocky in-shore, and some black rocks extend nearly 2 miles off. Between St. Andrew's and St. Pedro Rivers are the towns of *Half*, or *Little Drewin*, *Drewin*, and *Grand Drewin*, the first forming a small bay, 15 miles from St. Pedro, and Grand Drewin, 6 miles West of St. Andrew's Bay. St. Andrew's River, a considerable one, falls into the bay. A bluff point, on the West side of its entrance, is called *Swarton Corner*; and behind this, in the proper season, you may be supplied with wood and water. There is muddy ground at the river's mouth, and a black rod in the middle of it. Two large round-topped trees show themselves above the land, at about a league to the West of Swarton Corner. The land of Drewin, which is an even table land, seems pretty high when near the shore, but it is not nearly so high as it is said to be in the old descriptions.

In the Bay of St. Andrew's is an excellent road, with 12 to 8 fathoms, fine sandy bottom, with the two trees before mentioned N.W. by W. From this spot are seen three high hills, the St. Andrew Hills, 938 feet high, about 5 leagues inland, appearing in one when the river is open; and as to the eastward of the river there is a line of red cliffs, extending more than 4 leagues, this place may be readily known. By giving the chief his *dash*, or present, water may be obtained here, and boats may proceed 6 or 7 miles up the river, if well armed; for the people are very cunning, bold, and treacherous.* The common watering place is at about 2½ miles up, on the eastern side. The bar of the river is very bad, and is the common entrance of the St. Andrew's and of the Tabetah Rivers. King George Town stands on Swarton Corner, the West side of the entrance.

To the eastward of the cliffs beyond St. Andrew's Bay, the coast is generally very low, with a sandy beach; it has a very beautiful appearance; having many negro huts, overshadowed with trees of every shade, red, green, and orange. At 4½ miles East of the bay is *Trepow*, and at 12 miles begins a series of large reddish cliffs, which are a good landmark for this coast, differing from the portions of coast to the West. The village of *Kotrou* is 3 miles to the East of the first of these cliffs.

If you anchor off Kotrou, the enormous canoes of people will immediately put off with poultry, pigs, bananas, cocoa-nuts, &c. Tobacco is the most usual currency here.

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* This river was acquired by France, by virtue of ancient treaties passed in January, 1787.

The Rio de Lagos, or RIVER FRESCO, is 10 leagues to the eastward of St. Andrew's River. Here water may be obtained. At the Fresco the red cliffs terminate. The villages here also offer abundance of eatables.

Beyond the Fresco the coast is low and uniform, and a lagoon extends parallel to the coast line as far as Apollonia, leaving a narrow slip of land half a mile broad, on which stand numerous villages. The high land forms an inner range as far as the Lahou villages.

LAHOU.—JACK or PICANINY LAHOU is 12 or 13 miles East of the Fresco. Like all others here, it is surrounded with a straw palisade, and planted with palms. The low and uniform coast extends to *Half Lahou* and *Salt Town*, at 16 and 18 miles East of Picaniny Lahou. The town of Grand Lahou, on the West of the river of the same name, is the chief place of trade on the Quaqua Coast, and one of the largest and most populous in these parts. It has a pleasant aspect from the sea. Gold dust and teeth may generally be obtained here, mostly for fine India goods, though the commodities for traffic are variable, the natives being very fickle in their taste. Ships may ride before the town, as near the East shore as agreeable, in 8, 9, 10, 11, 12, and 14 fathoms, clay ground; but westward of the cape it is all mud, or sandy ground, with nearly the same depths of water.

From the River Fresco, above mentioned, in long. 5° 33½' W., lat. 5° 5' N., the coast continues in one unvaried straight line, in a most remarkable manner, to Picaniny Bassam, in long. 3° 57' W., lat. 5° 15' N., a distance of 97 miles, the direction being E. by S. ½ S. (*E. ½ N. true*). From thence it trends in a line equally straight nearly to Axim, in long. 2° 15' W., a distance of 53 miles, in the direction of S.E. by E. ½ E. (*E. by S. true*).

Bottomless Pit.—Off Picaniny Bassam, where the coast changes its direction, is a tract of sea of unfathomable depth. This gully is called the *Bottomless Pit*. Its general direction is North and South, and its breadth from 1 to 2 miles. On each side of it are from 40 to 70 fathoms; while at a quarter of a mile off shore there is no bottom with 100 fathoms, and at 2½ miles is a depth of 256 fathoms. Beyond this it exceeds 200 fathoms, although on its edges, at 9 miles off-shore, there is only 50 fathoms.

The coast, which is generally low, comprises the towns of *Jack Lahou*, *Jacque*, or *Jack-Jaque*, *Ivory*, and *Half Ivory Towns*, *Picaniny Bassam*, *Gammou*, and *Grand Bassam*. The trade has been chiefly in gold and ivory, especially at the Bassams and Assinee, the gold being reputed of a superior quality. Small cattle are also purchaseable, with fowls, yams, and palm oil. The produce of the last article is very great, and the season for it commences in September, after the *Gatoon Custom*, or harvest home.

The town of Jack Lahou is nearly 9 leagues from Lahou. The land appears double for the first 2 leagues of this extent. At about 11 leagues from Jack Lahou is Picaniny Bassam, on a steep shore, to the northward of the Bottomless Pit. Should you enter into 50 fathoms, you must anchor betimes, to avoid the danger of being driven on shore. The safest way for those trading here is to come-to, a few miles to the eastward, where from 35 to 30 fathoms, with sandy bottom, may be found.

GRAND BASSAM.—From Picaniny Bassam to the mouth of the *River Sueiro de Costa* and Grand Bassam the distance is 5 leagues. On advancing from the westward, the river may be easily known by the cliff or rock on the beach of its western point. The factory, also, will be seen on its western bank. There is good anchorage off the river in from 12 to 9 fathoms, mud and clay bottom, at 2 miles off. Plenty of water and refreshments may be obtained here. The town is 3 miles above the entrance, and opposite to it the large river of *Aka* and *Akba* debouches. A very extensive lake penetrates the country to the North and West of Grand Bassam, one arm extending 20 miles to the North, and another to the West of Picaniny Bassam. These lakes were explored by the French ship *Serpent*, in 1848, *Grand Bassam* (or *Fort Nemours*) was acquired by M. le Comte Bouet-Willaumez, about 1843. The factory, or Fort Nemours, is constructed on the extremity of the West shore of the river, consisting of a square palisade, with bastions, and four barracks for the garrison. There is good anchorage off the factory, in 11 to 14 fathoms. You can easily land, especially in the Senegal canoes, at the foot of the fort. The bar of the river, which is a very short distance East of the establishment, has a depth of 13 feet at low water, and ships of moderate draught can readily clear it; once inside, there is 5 to 7 fathoms water. The West winds assist the entrance, and the land breeze the leaving, of the river. The chief commerce of Grand Bassam is in gold, either in ingots or dust, which are accounted the purest on the coast.

RIVER ASSINEE.—Between Grand Bassam and the mouth of the Assinee River the distance is 9 leagues. The town of Assinee formerly stood on the eastern side of the entrance; but it was destroyed, in 1814, by the neighbouring hordes, from jealousy of the extensive trade previously carried on. The land about this place is low, but covered with high woods; and the river is now rather difficult to make out, being shut in by the trees; but it makes like a vista between the woods, which may be seen at a considerable distance. The current along shore hereabout sets rapidly to the eastward. You may anchor off the river in from 13 to 10 fathoms, sand and clay, at 1½ miles from shore.

ASSINEE (or FORT JOINVILLE) is another French possession, regained in 1843. It was an old French establishment, dating from the time of Louis XIV., but long abandoned. The fort, garrison, and establishment are quite similar to that of Grand Bassam; and, like at that place, gold is the chief object of trade. The river, after reaching the coast, turns at a right angle to the West, and after a course of 6 or 7 miles it debouches from behind a narrow, sandy tongue of land, which thus extends from its S.E. shore. The depth on the bar is about 10 feet at low water; and is, therefore, accessible to ships of moderate draught, but the entrance is difficult to make out and to clear. In coming from the West, the establishment will be seen, and may be known by three palm trees on the tongue of land separating the mouth of the river from the sea. Drifted by the current, as soon as these are made out, you must be ready to anchor in front of the factory. If you have cleared the bar, and worked up inside the river, you must also anchor before the factory.

At 7 miles from the entrance of the river, which runs eastward parallel with the coast, is the French commercial factory above mentioned, on the North, on a tongue of land which is a portion of the S.W. shore of the very extensive *Lake Ahy*, which, with the *River Bia*, or *Krinjabo*, is navigable in the dry season for 35 miles in direct distance from the coast; and during the rainy season this river would probably afford means of penetrating a considerable distance in the interior.

From the S.E. part of Lake Ahy the lagoon of Tendo runs parallel with the shore for 20 miles, at about a league inland. The depths on it are from 2 to 14 fathoms. *Lake Eghi* joins this lagoon at the back of the village of *Albany*, and is nearly 20 miles long, N.E. and S.W. On its S.E. side the *River Tanoé*, or *Tendo*, enters it by five mouths, not one of which is navigable; but the small *Lake Uani* has access to it, by which the French steamer *Guet N'dar* entered, and ascended it for 30 leagues, and thus penetrated Africa from the Gulf of Guinea farther than any expedition, except those on the Niger. Several new people, those of Anka and Afuma included, were thus visited, and their riches and commerce opened to European enterprise. The banks of the lakes and streams abound with enormous vegetation, and they may be navigated, as before stated, in all seasons. M. Duburquois' expedition to the River Tendo was in November, 1849; that of M. Boyer to Lake Ahy, &c., in 1843.

IV.—THE GOLD COAST, EASTWARD TO THE RIVER VOLTA.

The Winds and Seasons on this coast, generally, have been described in former pages. The interior is divided into different states, of which the kingdom of Ashantee, to the northward of *Ahanta* and *Fantee*, is the chief; and it is now the dreadful and predominating power of all the country. The extent of coast, from West to East, is about 95 leagues; and the countries which present themselves in succession are *Amanhea*, *Fantee*, *Inkran*, and *Adampee*; the last being divided from Aquamboo, on the East, by the River Volta.*

The kingdom of Amanahea is bounded West by the River Assinee and the Cobre, or Ancobre, near Axim. East of this is the territory of the Axim and the Ahanta country, the latter extensive district lying between Axim and Secondee. Boossooah, the capital of Ahanta, is near Boutrie. The *Wassaw* country runs along the whole of the northern boundary of Ahanta, and comes down to the sea coast at Secondee; its extreme East point is near Commendah (or Ekky Tekky, or Akataykie).

Between Cape Coast and Anamaboo, Fantee properly begins. Behind the line of coast on this part are the extensive countries of Abrah and Assin. *Coomassie* (or Kumasi), the capital of the Ashantee country, is situate inland about 180 miles due North of Cape Coast. The kings of Ashantee have, at one time or another, exercised dominion over, and collected tribute from, all the countries on the coast, and inland as far as Kong.†

Gold dust, once the staple article of commerce exported from this part of the African coast, is more plentiful in the Fanté town of Annamabo and Cape Coast than in those of Akkrah. It is brought to the former places by the Akim and Ashantee traders, and is considered by some authorities to be much inferior in quality to that obtained from Apollonia and Dixcove. It formerly was much more abundantly brought to Akkrah; but the superior market for European merchandize of Cape Coast has reduced the trade, to which reduction the fact that little or no gold is found eastward of Akkrah has contributed. The gold offered for sale or barter is usually adulterated, sometimes with great ingenuity, but this is easily detected by the customary supervision of a native personage, called a gold taker. Dr. W. F. Daniell, F.R.G.S.‡

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* The gold dust which is brought down from the interior is obtained from the alluvial sands and soil, and is washed down from the mountains, composed of granite, gneiss, and quartz. At Cape Coast even the sweepings of the streets are impregnated with gold. These are gathered up, and subjected to repeated washings; and the average sum that a whole day's labour at this employment will bring a woman will not exceed 2d. or 3d. a day.

† The name of Ashantee and Fantee, the principal nations on this part of Africa, is derived by some from a tradition that they were both the same people originally, and being at war with Akim, they endured the greatest distress from hunger; the Ashantees found subsistence from a plant called Shan, and hence were called Shan didi, or eaters of Shan; the others were supported by a tree called Fan, and hence were named Fan didi. The verb, didi, to eat, is best expressed by the letters dti, which makes Shandti and Fandti, a close approximation to the national names. The Europeans prefix A to Ashantee is never heard in the native pronunciation.—"Eighteen years on the Gold Coast," by Brodie Cruickshank.

‡ The following tables of the Fanté and Ashante currency, compiled by the late Mr. Maclean, are founded upon the division of the ounce into 16 ackies; the ounce being worth £4, and the ackie 5s. Its accuracy is guaranteed by the well known experience of the author.

There are numerous forts, or European factories, established along the coast, of which many are abandoned, and most are now of small importance. They owed their existence to the necessity of protecting the slave trade, a humiliating fact. Their office is now to introduce the civilizing influences of legitimate commerce.

Of the forts, &c., the first, which is on the eastern side of Cape Apollonia, is Fort Apollonia,* *British*, now abandoned. At Axim is Fort St. Anthony, *Dutch*.

On the Gold Coast, *beyond Cape Three Points*, are:—Acquidah, a fort, *Dutch*. Dixcove, or Nfooma, fort and settlement, *British*. Boutry, or Bautre, Fort Bartenstein, *Dutch*. Tacorady, or Tacorary, fort (ruins), *Dutch*. Secondee, Fort Orange, *Dutch*. Chama, or Assema, Fort St. Sebastian, *Dutch*, at the mouth of the Boosempra. Akatayki, or Commenda, fort, *British*.* Elmina, or Addina, or St. George, fort, *Dutch*. Cape Coast Castle (Igwa of the natives), *British*. Mauree, or Moree, Fort Nassau (abandoned), *Dutch*. Annamaboe, *British*. Cormantine (abandoned), *Dutch*. Tantumquerry Fort, *British*.* At Accra, James Fort, *British*; Fort Crevecœur, *Dutch*; Fort Christianborg, *British*, formerly Danish. Temma, of little consideration, formerly Danish. Pram Pram, a little settlement, *British*.* Ningo Fort, formerly Danish. Adda, on the River Volta, castle, formerly Danish.

On the coast beyond the Volta are, Quitta Fort, formerly Danish, 5 leagues to the north-eastward from Cape St. Paul; and in Whydah, forts at Griwhee, originally British, French, and Portuguese, but now in the possession of native chiefs, as shown hereafter.

A report was presented to Parliament, in 1842, upon the West Coast of Africa. The inquiries were principally directed to the state of trade, and the suppression of the slave trade. From it we extract the following:—

Table I.—Fante Currency.

Names of Weights.	Weight in		Value.			Names of Weights.	Weight in		Value.		
	ozs.	ackies	£	s.	d.		ozs.	ackies	£	s.	d.
Pessua	—	1/48	0	0	1¼	Essien	—	6	1	10	0
Simpoah	—	1/24	0	0	2½	Acandjua	—	7	1	15	0
Takufan	—	1/12	0	0	5	Djua	½	8	2	0	0
Kokua	—	1/8	0	0	7½	Sul..............	—	9	2	5	0
Taku	—	1/6	0	0	10	Sua-ne-sul	—	13½	3	7	6
Suafan............	—	5/6	0	4	2	Djuamien	1	—	4	0	0
Meaton (or Giri-fan)	—	1	0	5	0	Essuanu	1	2	4	10	0
Sua	—	1⅔	0	8	4	Djuamiensan	1	8	6	0	0
Agiratjwi (or Gira)	—	2	0	10	0	Essuasan	1	11	6	15	0
Ensan	—	3	0	15	0	Bendah	2	—	8	0	0
Djuasul	—	4	1	0	0	Perigwan	2	4	9	0	0
Perisul	—	5	1	5	0	Entenu	4	8	18	0	0

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* British forts, &c., abandoned, are distinguished thus (*).

Table II.—ASHANTE CURRENCY.

Names of Weights.	Weight in		Value.			Names of Weights.	Weight in		Value.		
	ozs.	ackies	£	s.	d.		ozs.	ackies	£	s.	d.
Pessua	—	$\frac{1}{64}$	0	0	$0\frac{15}{16}$	Insuansan........	—	$2\frac{1}{3}$	0	11	8
Damba	—	$\frac{1}{32}$	0	0	$1\frac{7}{8}$	Bodomu	—	$2\frac{1}{2}$	0	12	6
Takufan	—	$\frac{1}{16}$	0	0	$3\frac{3}{4}$	Ensan	—	3	0	15	0
Taku	—	$\frac{1}{8}$	0	0	$7\frac{1}{2}$	Djuasul..........	—	$3\frac{1}{2}$	0	17	6
Taku-mienu	—	$\frac{1}{4}$	0	1	3	Sul..............	—	$4\frac{1}{2}$	1	2	6
Takumiensan......	—	$\frac{3}{8}$	0	1	$10\frac{1}{2}$	Perisul	—	5	1	5	0
Suafan	—	$\frac{3}{4}$	0	3	9	Essien	—	6	1	10	0
Dumafan..........	—	$\frac{11}{12}$	0	4	7	Djua	—	7	1	15	0
Brofan............	—	1	0	5	0	Anenfii	—	$7\frac{5}{6}$	1	19	2
Agiratjwifan	—	$1\frac{1}{12}$	0	5	5	Esua	—	9	2	5	0
Insuansafan	—	$1\frac{1}{6}$	0	5	10	Suane-sul	—	$13\frac{1}{2}$	3	7	6
Bodorabufan	—	$1\frac{1}{3}$	0	6	8	Essua-nu	1	2	4	10	0
Sua	—	$1\frac{1}{2}$	0	7	6	Essua-san	1	11	6	15	0
Duma	—	$1\frac{5}{6}$	0	9	2	Essua-san-sul	2	—	8	0	0
Brofu	—	2	0	10	0	Perigwan	2	4	9	0	0
Agiratjwi	—	$2\frac{1}{6}$	0	10	10	Entenu	4	8	18	0	0

N.B.—An ackie is equal to 8 Ashante takus, and to 9 Fante takus. This table is extracted from "Ethnography of Akkrah," &c., by W. F. Daniell, Esq., M.D., F.R.G.S., in Edin. New Philos. Journal, Vol. liii., 1852, pp. 129, 130.

The territory surrounding Cape Coast Castle was originally obtained from a tribe called the Fetus, who have long since ceased to have any power or influence. It is now generally said to be situated in Fantee; though, strictly speaking, it is not situated in Fantee Proper. The Fantee language is spoken. Being the seat of the local government, the territory belonging to it is understood to comprehend the entire colony, from Dixcove to Accra. The territory formerly attached to it does not exceed 130 square miles. A small river, the Kakoom, or Sweet River, runs through it, and enters the sea 5 miles to the westward. Several rivers, namely, the Amissa, Anaqua, and Sacoom, enter the sea between Cape Coast Castle and Accra. None are navigable, or can be entered by vessels, but the rivers last mentioned are navigable for canoes and small craft for considerable distances into the interior. There are no harbours, with the exception of Dixcove, where small vessels, drawing 6 or 8 feet of water, might enter in good weather. The remainder are open roadsteads; and vessels discharge their cargoes at from three-quarters of a mile to a mile from shore. The roadsteads of the several settlements may be said to be always safe, and wrecks very rarely occur; where they have taken place, they have invariably occurred through carelessness, or causes that ought not to have existed.

The Dutch town of Elmina, 7 miles to the westward, is the nearest large town to Cape Coast Castle; and none of the native towns near Cape Coast are large, or can be called other than villages. Djuguau, 16 miles to the N.W., is the largest. The communication with all the neighbouring, as well as some distant towns and villages, is constant.

The native population are exceedingly addicted to quarrels, or "palavers," as they are called, and these frequently were the sources of constant petty wars; but, generally, the natives are not of warlike habits. It is now perfectly safe for any person to traverse any part of the country, and residents can go with perfect safety to Coomassie, a distance of about 180 miles from the coast. The *slave trade* may be said to be extinguished on the line of coast from Apollonia to Accra.*

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* Report, &c., as above, Governor Maclean, App., pp. 68—70.

Slavery on the Gold Coast prevails to a great extent among the natives. Those slaves which are chiefly for domestic service, and not for prædial labour, are treated with mildness, and are, consequently, comparatively happy. The Fantees make no wars now to obtain their slaves; those which they hold are either born in bondage, or are what are called "slaves of the house," and are more leniently treated than others; or are purchased in the neighbouring countries, where the slave trade is still carried on; or they are taken in "pawn" either for the debts of others or themselves; and not being able to pay these debts, they lapse into slavery.

In 1827, owing to the heavy expense incurred by Sir Charles M'Carthy, in his disastrous war with the Ashantees, the English Government withdrew all the public establishments from the coasts, and gave up the forts to the merchants, to be held by them as factories. It was then determined that the forts should be delivered over to the merchants on the following conditions:—viz., that the two principal forts of Cape Coast Castle and Accra should remain dependencies of Sierra Leone; that British law should continue in force there; and that the affairs of the forts should be chiefly managed by a committee of merchants of London, appointed by the Government. The forts formerly occupied by the African Committee were the following:—Apollonia, Secondee, Commenda, Cormantine, Tantumquerry, Winebah, and Whydah.*

Mr. John Jackson was chosen president, but it was considered best to have an officer at the head of affairs in no way connected with trade, and Mr. George Maclean an officer in the African corps, was appointed governor in 1830. Of the very difficult nature of this worthy gentleman's office, and of the excellent manner in which the national honour was maintained by him, it would be far too diffuse to speak here. The slight slur cast on it by the Report of Dr. Madden was afterwards fully removed, and the merits of Mr. Maclean's government acknowledged by a select committee of the House of Commons. The affairs of the Gold Coast were taken more immediately under the control of the Crown in 1844, and the governorship was given to Commander Hill, R.N., and Mr. Maclean's long and arduous services rewarded by a secondary place, which he fulfilled with the utmost probity, and entailed upon him the whole judicial administration of the country. He died at Cape Coast in May, 1847, amid the tears and lamentations of the natives, and the deep regrets and respect of the whole of the white population.* Captain Hill soon resigned his appointment to Captain Winniett, who, to subdue the atrocities of a monster, Quawe Accah, king of Apollonia, undertook an expedition against him, after he had killed the French commandant of Assinee, &c., and in April, 1848, he overtook his force, and took him prisoner. The expedition, though perhaps rash, being successful, procured the honour of knighthood for Governor Winniett. At this time the King of Denmark sold his forts on the Gold Coast for £10,000 to the English, who were considered to have a good bargain. They consisted of Fort Christansborgh at Accrah, and three minor stations, Ningo, Addah, and Quittah, the latter only being habitable. The possession of these, gained in 1851, gave to the English the government of the whole line of coast between Accrah to the East of the Volta, and the control of the tribes subject to Denmark, and secured to us the advantages of the navigation of the Volta, and the resources of a country rich in palm trees, and an industrious population. Governor Sir William Winniett died at the end of 1851, without seeing the completion of his favourite scheme to make the colonies self-supporting; but in April, 1852, Major Hill and the council imposed a poll-tax of one shilling on every man, woman, and child, in the districts under British protection. The Dutch, whose settlements are dovetailed between ours, having declined to impose similar customs duties, the idea was abandoned. Since that time the government has been steadily advancing, and there can be little doubt, from the desire of the natives for this progress, that it will be continuous. The small poll tax has been quietly collected, and will do much to aid this advancement.

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* To those trading on the coast it may be useful to know the meaning of the following words used in the Ashantee countries, &c., as they have been explained by the late Mr. Bowdich.

A Book or Note.—A certificate of a monthly pension, formerly paid by the African Committee to the Fantee chiefs in the neighbourhood of the British settlements, in consideration of their attachment, influence, and services; which books or notes have been claimed by the King of Ashantee, as his by right of conquest.

Caboceer, a chief, governor, or magistrate. Croom, a town or village. Custom, a festifal, carnival, public ceremony, funeral rite, sacrifice. A Dash, a present. Palavar, a dispute, a debate, argument, or suit. Pynim, an elder or counsellor. To Panyar, to seize or kidnap. Stool, throne, seat in council, inheritance. Fetishe, a charm, amulet, deity; any supernatural power or influence; anything sacred. A Fetishe-man, a priest.

The System of Barter on all the coast is that termed the *Ounce* and Ackie Trade; every article of merchandise being estimated at so many ounces or ackies of gold; the former being the ounce troy, and the latter the sixteenth part of an ounce. The principal articles of export are gold, ivory, palm oil, gums, and pod-peppers. The cloths for the market must, generally speaking, be India, and those of the finest texture; for the extreme nicety of the black merchants, in their taste and choice, surpasses that of the most scrupulous and refined London tradesmen. In receiving gold dust, it is requisite to have the assistance of a regular native *gold-taker*, from Cape Coast; as many have discovered, much to their sorrow and loss, that the filings of brass pans are not gold! See farther, on this subject, the injunctions in Lieut. Bold's book, page 57; and Adams's, page 104.

The CURRENCY of the Gold Coast is represented by the Indian cowrie (*cypræa moneta*), a small shell originally exported from the East, and now diffused in vast quantities throughout Western Africa. Formerly for convenience they were perforated and stung together in definite numbers, which hence was called strings and heads. The following will explain the system.—

Heads.	Strings.	No. of Cowries.	English value.
0	0½	20	£0 0 0½
0	1	40	0 0 1
0	12	480	0 1 0
1	48	1,920	0 4 0
1 oz. of gold dust, or 20	960	38,400	4 0 0

The value of the dollar, however, differs, and hence, consequently, the value of the cowrie is also changeable. At Cape Coast the dollar is estimated at 4s. 6d. (or 54 strings equal to 2,160 cowries), in Akkrah at 15s. (equal to 60 strings, or 2,400 cowries) currency, and elsewhere at its sterling price 4s. 2d. (or 50 strings equal to 2,000 cowries.)†

DESCRIPTION, &c.—Between the HIGH LAND of DREWIN, which has been described, and APOLLONIA, in long. 2° 35′ W., the face of the country appears from the mast head of a vessel extremely low; but towards and at Apollonia commences a range of hills, or what may be called an undulating country, which reaches to Barracoe.

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* Mrs. Maclean, the celebrated and accomplished lady of the governor, known to the world as L. E. L., (Letitia Elizabeth Landon), died at Cape Coast Castle, on the evening of the 15th of October, 1838. The circumstance of her death, as is well known, is enshrouded in a painful mystery, and has been made the subject of much misrepresentation. She and her husband were tenderly attached to each other, and they now lie side by side on that lone shore. Mr. Cruickshank, who was with her on the evening of her death, is of opinion she died from some sudden affection of the heart, and greatly doubts the facts or testimony that it was by her own seeking. An interesting account will be found in the 8th chapter of his first volume. See, also, Mr. Consul Hutchinson's "Impressions of Western Africa," pp. 60—62, where Mr. Cruickshank's statements are corroborated.

† W. F. Daniell, Esq., M.D., F.R.G.S., &c. See "Edin. New Phil. Journal," vol. lii., page 128.

None of these hills have a greater elevation than 400 or 500 feet, and few are so high, except the *Devil's Hill*, near Winebah, and *Ningo*. All are thickly wooded.

From ASSINEE to APOLLONIA the distance is 14 leagues S.E. by E. ½ E. Eight leagues to the eastward of the former lies *Albanee*, a little town on the beach, to the West of a square wood, close by the sea side. You may anchor between this town and Assinee, in 13 and 14 fathoms, good ground. Two degrees farther eastward lies *Tabo*, near the western side of a river, called the *Gold River*, which has been a place of active trade. The river is inaccessible, and the coast should be approached with great caution, as it is very shoal 2 leagues out, with an indraught and heavy surf on shore.

Between Tabo and Capo Apollonia commences the undulating appearance of the country, interspersed with clumps of palm trees, which have been already noticed. Four eminences, in particular, distinguish the coast, and are conspicuous from the westward: but, in approaching, three only are commonly seen. These stand at an equal distance from each other, and stretch in a line along shore, the highest being 284 feet.

The ground about Cape Apollonia is foul. The only good anchorage is in 14 fathoms, the abandoned fort bearing N. ¼ W., and the Cape N.N.W. ¼ W. The ruins of the fort stand on the beach. The landing is very bad, and it is dangerous to cross otherwise than in the canoes of the natives. Neither wood nor water are to be obtained here, and very few refreshments, as limes and fowls, which may be had for shirts, &c. You land on the beach in the canoes from the factory, bringing your own boat to a grapnel short of the surf. The gold dust of this place has been noted for its superior quality and quantity; and it, with ivory, may be purchased in barter, as at Cape Lahou.

AXIM.—*From Cape Apollonia to Axim* the distance eastward is 7 leagues. This is the vice-presidency of, and first factory on, the coast possessed by the Dutch. The water here is very good, and runs from a spring; and boats land very easily behind some rocks. The mouth of the *Seenna*, otherwise *Cobra*, or *Snake River*, is about 2 miles westward of Axim. The entrance is apparently rocky, and very small. Three black rocks lie to the eastward of the entrance, about 1½ mile from shore; the sea breaks heavily over them. You may anchor in 8 fathoms, muddy bottom, with the fort N.N.E. 2 miles from shore.

The two groups of houses, in the midst of which rises the Fort of Axim, seem to be very miserable, and offer but few resources in provisions. Water may be got from a well in a marsh behind a fort, but consequently is not good. The facility of communication seems to be the only advantage that Axim possesses.

At about 4 leagues to the south-eastward of Axim are the ruins of *Fredericksburg*, or *Bradenburg Castle*, formerly a Dutch fort, now covered with bushes.

CAPE THREE POINTS.—This projection, or promontory, as its name indicates, forms three headlands, ranging nearly true East and West. The middle one is properly the Cape. The distance between the extremities is 3¼ miles. The land is even and moderately high, but the shore exceedingly rocky, excepting the interval of two sandy bays. The small town of *Tacramah* is between the West and middle points. The South extreme of the Cape is in lat. 4° 44′ 50″ N., long. 2° 5′ 45″ W.

The current here is extremely rapid, and commonly sets directly in upon the reefs, which are steep-to, and the ground without is rocky and foul. In passing, give the land a good offing, at least of 3 leagues, and you will avoid all danger. The Cape Shoal, with 2¼ fathoms least water, lies three-quarters of a mile South and S.W. of the middle cape. To those bound to a roadstead eastward, it should be known that the current, beyond the cape, has carried many vessels bound to Cape Coast, or Anamaboe, &c., to leeward of their ports, and occasioned much trouble and delay in beating back again; but this may be avoided by proper caution.

Acquidah, a Dutch fort in ruins, stands on the beach upon a point 1½ mile N.E. of the eastern point of Cape Three Points. Off this place you may anchor in from 14 to 21 fathoms, at the distance of 3 or 4 miles. Within a mile of the shore are several rocks.

DIXCOVE.—From Acquidah, 3½ leagues to the eastward, lies *Dixcove*, originally *Dick's Cove*, an English fort and settlement, and said to be as well situated for trade as any upon the coast, having abundance of refreshments, with wood and water. The territory of Dixcove was obtained from the Ahanta tribe, who at present number about 30,000 or 35,000 souls. The Ahanta country begins at Prince's or Fredericksburgh (Dutch), and ends near Secondee (English and Dutch Settlement), nearly 40 miles of sea coast, and extends about 30 miles into the interior. The British settlement of Dixtove owns about 5 miles of sea coast, and extends 20 miles or so into the interior. Sufficient corn, &c., is cultivated for the use of the inhabitants, and the soil is generally considered fertile. The natives are well disposed towards the English. The British subjects on the Dixcove territory consider themselves quite apart from the rest of the Ahantas, who are Dutch, which has been the cause of their several wars. These have attacked the fort unsuccessfully twice during the last thirty years.[*] M. Bouet-Willaumez says that "the fort is well kept up. The garrison is composed of about 30 black soldiers, commanded for several years by Mr. Frank Swanzy, an officer of great urbanity and convivial hospitality."

There is a small sort of harbour, made by a reef of rocks, but which is fit only for boats and barks, and a fine landing. The fort is quadrangular, and built on a rising point of land: to anchor, you bring it North or N. by W., or even N.N.W., and the easternmost point of Cape Three Points W. ½ N.; then it is just in one with the westernmost point of the road. You lie in 15 fathoms of water, clear oozy ground. There is a current, which changes at uncertain periods. Water may be got conveniently, but it is very indifferent, being from a still pond. You land in a small cove on the West side of the fort, and roll the casks a small distance. If the commandant of the fort does not offer water from his tanks, it is better to go to Boutry for it. Unless the sea be very boisterous, this is one of the best landing places on the coast, as small vessels, drawing 11 or 12 feet of water, have been hauled on shore, cleaned, and repaired here. There is a rock in the middle of the cove, on either side of which you may pass. Much gold, of a fine quality, has been obtained here. Proceeding eastward from Dixcove you leave to port a black islet surrounded by reefs, called *Abboocore*, or the *Sanco Stone*, which separates the anchorage of Dixcove from that of Boutry.

BAUTRY, or BOUTRY, a small Dutch settlement, having a fort, long since abandoned, and now decaying, is 3 miles to the north-eastward of Dixcove, beyond the point of a small bay. Fowls, ducks, and corn may be obtained here. The coast from Cape Three Points consists generally of a chain of hillocks, covered with wood.

Secondee, or *Secundee*, an insignificant place, lies 6 leagues to the E. by N. of Dixcove. Between this and Boutry the Dutch had the fort of *Tacorady* or Tacorary, now in ruins, and *Fort Orange*, about half a mile to the westward of Secondee. The last may be easily known, as the fort is built on a reddish point of land, with a low, sandy beach eastward and westward. The interior country, North of Tacorady, called the *Adoom* District, is said to abound in gold; but the pits have not been worked for many years.

The coast, both East and West of Tacorady, is extremely rocky; and at the distance of a league from the village, in the offing, is a reef, 4 or 5 miles in length, that commonly breaks, although there is a depth of 4 fathoms close to it. In the night you should not approach it nearer than in 16 fathoms, and then with caution; as the current, in light winds, may set toward the shoal. On the point South of Tacorady is the *Tacorady Shoal*, bearing E.S.E. 1 mile from the point.

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[*] Government Report, 1842, Appendix, pp. 73, 74. Mr. F. Swanzy, Commandant.

Chama, or ASSEMA, distinguished by the Dutch fort of *St. Sebastian*, lies about 7 miles north-eastward from Secondee, and at a short distance south-westward from the mouth of the *Boosempra*, or St. John's River, where the largest and best canoes are made, and long boats may go in to get fresh water. The fort is rendered very unhealthy by the damps that come from the river.* Captain Adams says that Chama possesses much the same facilities as St. Andrews (see page 467). The canoes made of the ceiba, or silk-cotton tree, are brought down the river, a little way from the interior, to Chama, and are purchased chiefly by the Portuguese of Whydah, Ardrah, and Lagos, in Dahomey. After passing Chama, the coast is broken by some reddish cliffs, called *Cotobray ;* and you will also see a second range of high lands behind them on the coast.

The RIVER BOOSEMPRA is the western boundary of the *Fantee country*, which, after a dreadful war of extermination, may be now considered as incorporated with the kindom of Ashantee.† The Fantees are black as jet, muscular, and well formed; and those, says Captain Adams, who are engaged in fishing, and employed as canoe men, can endure much bodily fatigue, although they are apt to make excuses for abridging their labour. Their national mark is three small perpendicular incisions on each temple, and on the nape of the neck. In the construction of their dwellings and canoes they exhibit much superiority and skill over other African tribes. The women are well formed, and many are not wanting in personal beauty, as their features are small, their limbs finely rounded, their hands and feet small, and their teeth uniformly white and even. The women here, however, as well as in most other parts of Africa, sow and reap, grind corn, carry wood and water, and perform all the drudgery attendant on housekeeping, while the husbands are recreating or sleeping.

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* Mr. Bowdich says, "At six hours' pull up the Boosempra is an island, where Attobra, one of the Warsaw chiefs, who supplies the Dutch with canoes, has a large house; four hours above which is his croom. Colonel Stahrenberg was pulled three days up the river in a canoe; his progress was much impeded by rocks, and at length arrested by a large cataract, which, being considered a powerful fetishe by the natives, the canoe men dared not to approach."

† This country has been well described by the late Mr. T. E. Bowdich, in his interesting volume entitled, "Mission from Cape Coast Castle to Ashantee," published in 1819.

Under the instructions of John Hope Smith, Esq., governor in chief of the British settlements on the Gold Coast, this mission left Cape Coast Castle, for the capital of Ashantee, on the 22nd of April, 1817, in order to establish an amicable commercial intercourse with that state; for, previously, the army of the Ashantees had invaded and disturbed the whole country, more particularly Fantee, in which Cape Coast Castle and several other British factories are included. Mr. Bowdich says, that in 1807 an Ashantee army reached the coast for the first time. The Ashantees invaded Fantee again in 1811, and the third time in 1816. These invasions inflicted the greatest miseries on the Fantees. Few were slain in battle, for they rarely dared to encounter the invaders; but the butcheries in cold blood were incredible, and thousands were dragged into the interior to be sacrificed to the superstitions of the conquerors. Famines, unmitigated by labour, succeeded the wide waste of the Fantee territory, the wretched remnant of the population abandoning itself to despair; and the prolonged blockade of Cape Coast Castle, in the last invasion, engendered so much distress and hazard, that the Government, having averted eminent danger by advancing a large sum of gold on account of the Fantees, earnestly desired the African Committee to authorize and enable them to venture an embassy, in order to deprecate these repeated calamities, to conciliate so powerful a monarch, and to propitiate an extension of commerce. This accordingly took place. A treaty of peace and friendship was ratified; but it was of short duration. In 1823, war with the Fantees again raged: and the army of Ashantee was opposed to these people, headed by the gallant Sir Charles M'Carthy, governor of Sierra Leone, &c. It is needless now to say that in January, 1824, the Fantees were nearly annihilated, and Sir Charles fell in the action. So complete was the discomfiture, that the marines of H.M.S. *Owen Glendower*, then on the station, were sent to garrison our principal fort, Cape Coast Castle. (For other interesting particulars, see the *Times*, May 3rd, 1824; and also Eighteen Years on the Gold Coast, by Brodie Cruickshank, vol. i., pp. 150—2.)

The custom of sacrificing human beings to the manes of their ancestors is common to all this country.

Commenda.—From off Chama you may see AKATAYKI (Ekky Tekky), or *Commenda,* which is nearly 3 leagues to the north-eastward; and where there are two small forts, Dutch and English, both now abandoned. This place may be known by a small mount on the left, called *Gold Hill.* The coast near the forts is foul, and you should not approach nearer than in 9 fathoms. To anchor, bring the English fort to bear N.W., where you will have a good sandy ground.

ST. GEORGE D'ELMINA, or ELMINA, or ADDINA, the chief settlement of the Dutch on the coast, lies 8 miles westward of Commenda. The town is considerable, and the trade with Ashantee is of some importance. It is readily known by the high and double walls of Fort St. George, and the fortifications of Fort St. James, standing on a height behind Fort St. George. The town of Elmina is divided into two portions. One is built beneath the guns of the fort, on the peninsula formed by a small river, and consists of a mass of filthy negro huts, separated by streets or lanes, not less dirty. The other part rises from the left bank of the small river; it consists of a good number of European houses, and negro huts less dirty than those of the other part. A pleasant promenade and public garden render a visit or residence at this place very agreeable.

Water may be got at Elmina, but should be procured from the cisterns of the fort. Provisions of all sorts may be got, even bullocks, but they are very dear. It is best to use the native boats to land or embark, as the ship's boats cannot land at other times than high water, on account of the shallowness of the small river which penetrates the town.

The anchorage in the roads is in 7 fathoms, sandy bottom, with the castle bearing North, distant 2 miles; Mount St. Iago a little open to the westward of the castle; and Tantumquerry Point, East.

CAPE COAST CASTLE.*—From St. George d'Elmina you see Cape Coast Castle, 7 miles to the E. by S. This is the principal British fort on the Gold Coast. To the left of it is a small conic hill, called *Phipps' Mount,* surmounted by a tower; and by this, and other marks described beneath, the place may be readily known. The climate in the vicinity is described as generally more healthy than other parts; but even here, from June to September, during the rains and exhalations, it is pernicious. When the sea is calm, water may be obtained here, by coming to a grapnel at a little way from shore, as black boys may be engaged to swim the casks to and from the boats; but as the water is collected and preserved in tanks, it is in the dry season bad and unfit for use.

The Government Report on the condition of Sierra Leone and the other British settlements on the African Coast, which was published in 1830, includes the recommendation (in 1825) of the late Major-General Turner, to retain troops at Cape Coast and Accra only. This recommendation was subsequently adopted, and the other British establishments on the Gold Coast were abandoned.

On this place, it has been said by Captain Adams, "The Gold Coast is nearly, if not quite, as unhealthy as Sierra Leone; and if the gentlemen sent out to Cape Coast Castle were lodged, on their first arrival from Europe, 1 mile in the interior of the country, instead of within the walls of that castle, the fact would too soon be fatally realized.

"The superior healthfulness of the castle itself may be accounted for by its southern rampart wall being built upon a ledge of rocks which project a little way into the sea, and against which rocks the sea beats with great violence; thereby creating, at all times, a cool and refreshing current of air within the Castle. The sea breeze also blows directly into it, pure as the element over which it wings its course; and, at some seasons of the year, this breeze continues blowing days and nights without intermission."

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* The words Cape Coast appear to be a corruption of the Portuguese named *Cabo Corso* (cruising cape). See J. J. Lopes de Lima, "Ensaio sobre das Possessoes Portuguesas," livro ii., part 1, p. vii.

In a concluding paragraph of the Report above mentioned, it is also said, by a physician, Dr. Barry, that no cultivation, no sanitary regulations will ever render these settlements congenial to European constitutions, particularly to the common soldier, whose irregular habits are too strongly confirmed ever to be eradicated.

"It would appear, from the examination of Mr. President Maclean, that the prevailing diseases of which Europeans die at Cape Coast Castle are remittent or intermittent fevers and dysentery. The majority of Europeans are generally taken off between the ages of 18 and 30. This locality is considered healthy when compared with Jamaica, Cuba, or Barbadoes. The most sickly part of the year is from the 20th of July to the 20th of September. The remittent and intermittent fevers which prevail during these months (May, June, July, and August) are generally more fatal to those who have arrived from Europe late in life, than to those who arrive out young.

The troops at Cape Coast Castle are commanded by a European. The native population of Cape Coast Castle is 5,000; European merchants, 12; missionaries, 6; and other white residents, 12 or more. The Europeans occupy about eighteen stone houses, valued at £1,000 to £2,000 sterling each. The natives live in "swish" houses, made of mud, which becomes hard and durable, and they last as long as the roof resists the rain. The authorities of the Castle exercise power over the whole of the country, from Dixcove to Accra, an extent of 120 miles. Civilization is said to be confined within the limits of the Castle. The whole country about Cape Coast Castle is one great wilderness of verdure. It is only about 15 or 20 miles from the sea side where cultivation is carried on to any extent. From this distance the plantains, yams, cassava, and corn, are carried on the heads of the women to market, with their infants slung across their backs. The men treat the women in the most revolting manner, making them do all the drudgery of labour. The consequences of this brutal treatment are, the women suffer from premature exhaustion, decrepitude, and decay. The soil is poor on the sea side, but 4 miles inland it is fit for any kind of tropical produce. Mr. Swanzy made an attempt to introduce the growth of cotton and coffee, and spent much time and money in the experiment. At his death the cultivation of cotton was neglected. The cotton trees are now growing wild, and the cultivation is entirely given up. The coffee grown on the western coast of Africa is said to be nearly approaching in quality to that of Mocha; but the heavy duty, 1s. 3d. per pound, imposed on its importation into England, amounted to an absolute prohibition of its growth. The trade of Cape Coast has considerably decreased of late years.

In a communication addressed to J. Bennett, Esq., Lloyd's, by Mr. Wm. Hutchinson, and dated Anamaboe, 2nd March, 1827, it is stated that several vessels bound to Cape Coast Castle, &c., have run past their port from mistaking Cape Coast Castle for Elmina, and Anamaboe for Cape Coast Castle. He adds, that Cape Coast, viewed from the sea, has now a very different aspect to what it had before the rebuilding of Phipps' Tower, now *Fort William*, and the erection of other fortifications on the heights behind the town. It is the more important to know the new marks from the consideration that, if a vessel gets too far to leeward, she cannot get back for a considerable time, nor without difficulty.

Cape Coast Castle presents an extensive front of 180 yards to the sea, but it lies low. It is also distinguished by the objects named *Fort Victoria*, *Fort William*, *Smith's Tower*, and *M'Carthy's Battery*, with the *Military Hospital*. Smith's Tower is a circular building, of which the fortified wall only is seen on a hill of red clay. M'Carthy's, or Hospital Battery, is an equilateral triangle, with a small citadel at the N.E. corner. Smith's Tower, Phipps' and Elmina Castle, in a line, bear E. and W. Smith's Tower to M'Carthy's Battery, S. 70° E. The position of the Military Hospital, lengthwise, is N.W. ½ W. The North Bastion of Cape Coast Castle, according to Captain Vidal, is in lat. 5° 6′ 10″ N., long. 1° 13′ 51″ W.

Lighthouse.—In 1835, the President of the Committee of Merchants before mentioned (appointed for superintending the grant annually voted for the maintenance of the Forts and Factories) gave notice that a light would be exhibited at Fort William, from the 1st of October of that year, and thenceforth continued from sunset to sunrise, for the guidance of vessels bound for the Forts of Elmina, Cape Coast Castle, Anamaboe, and the adjacent settlements.

The light, which is brilliant, burns at an elevation of 204 feet above the medium level of the sea, and at a distance from the beach of 760 yards. It is visible to vessels in every direction, whether approaching or sailing parallel to the line of coast.

In steering for the anchorage of Cape Coast Castle, vessels ought to bring the Light to bear N. ¾ W., keeping the lead going, and to anchor in 6½ or 7½ fathoms of water; the light being then distant about 2 miles. For large vessels, at *night*, 7 or 7½ fathoms is near enough to the beach.

"In ordinary weather the light will be visible at the distance of about 7 leagues, and will be of great service in preventing vessels being carried to leeward of their port by the strong south-easterly current, which runs off the coast about 10 months in the year."—(Signed, George Maclean, President.)

Upon the foregoing, Capt. Midgley remarks (1838), "The directions for Cape Coast Roads, by Governor Maclean, are judicious, but the light is very poor. The weather must be very clear when it can be seen 10 miles off, unless it has been much improved. I found a good and very convenient berth in 7 fathoms of water, with the Lighthouse, on with the highest part of the large black rock under the Castle, distant off-shore 2 miles.

A *time ball* has also been established here, the notice and description of which are subjoined below.*

The *bearings from the anchorage* in Cape Coast Castle Roads, as taken on board H.M. schooner *Prince Regent*, lying in 8 fathoms, bottom of stiff mud, were—the Castle flagstaff N.N.W., distant 1¼ mile, in a line with the hall of the Castle and Smith's Tower; Elmina Castle W. by N., 9 miles; Queen Anne's Point N.E., 3 miles; and Anamaboe Point E. by N., abont 10 miles.

ANAMABOE.—In sailing from Cape Coast Castle toward Anamaboe, the remains of *Mauree*, or *Moree*, and the Dutch Fort *Nassau*, will be seen. Here you will have regular soundings of 8 and 9 fathoms, at about 3 miles off-shore. Anamaboe Fort is a small square fortification, with four bastions and four curtain walls, mounting 27 guns, lying low on the beach; and it cannot, if the preceding description be attended to, be mistaken for Cape Coast Castle, from which it is distant 3 leagues.

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* CAPE COAST CASTLE.—A notice, dated Hydrographic Office, Admiralty, 1st November, 1839, states that, at Cape Coast Castle, all vessels in the Roads may ascertain the errors and rates of their chronometers, without exposing them to the risk of being carried on shore through the surf.

A flagstaff, with a gaff, has been erected on the southern turret of the Castle; and at 11^h 30^m mean time, on every day, a red flag, with a white ball in the centre, will be hoisted at the head, as a preparatory signal.

At 11^h 55^m, Greenwich time, a *black* ball, 5 feet in diameter, will be hoisted at the gaff-end, and the flag lowered; and, at the instant of noon, Greenwich mean time, the ball will be dropped from the end of the gaff, and will immediately disappear.

As the falling of the ball must occupy more than a second of time, the instant of noon is to be reckoned from the separation of the ball from the gaff.

The latitude of the flagstaff, as given in the notice by Geo. Maclean, Esq., President of the Council, is 5° 5′ 25″ N., and its longitude 1° 12′ 5″. Captain Vidal gives the North Bastion in long. 1° 13′ 51″, as above. Captain W. F. Owen had previously given it in 1° 13′, or 5′ eastward of the position before assigned to it.

"Anamaboe," says Mr. Duncan, "is a town of considerable trade. It has also a very good fort, which, howevery is gradually going to decay. Its ramparts are well supplied with artillery, and capable of making a good defence against an attack from the sea, if properly garrisoned, and it is quite impregnable by the natives on the land or North side."—Vol. I., p. 39.

"The only thing in the nighbourhood of Anamaboe worth mentioning as a sign either of improvement or enterprise is a good road for about 10 or 12 miles into the interior, made by an intelligent merchant named Barns, for the purpose of conveying timber to the coast." *

Anamaboe Town contains 6,000 inhabitants; but the whole of the Fantee, and other towns under this fort, might amount to 50,000. The soil along the sea-board is poor, but improves as you advance into the interior. Indian corn, yams, cassada, plaintains, &c., are grown; not one-thousandth part of the land is under cultivation, but it is on the increase. There are several large native towns in the interior, from 12 to 40 miles distant. The commandant of the fort is under the direction of the governor and council of Cape Coast Castle; there is a magistrate, and one resident European merchant. The fort is in tolerable repair, and garrisoned with seventeen soldiers. It is better adapted for trade with Ashantee than Cape Coast; and it is thought that in a few years Anamaboe will have the greater part of the trade of the Gold Coast. The trade is principally carried on in London and Bristol ships. The legal trade with the natives has increased greatly.

There is anchorage at Anamaboe, directly before the town, in 7½ fathoms, with Cormantine Fort N.N.E. You may anchor in the same depth, with the flagstaff of the fort in one with the second of the Cormantine Mountains, the chain of high land seen inland to the right. The latter is considered as the best berth. Wood, water, and provisions may be obtained here.

Cormantine.—The former Dutch settlement of Cormantine lies about 2 miles north-eastward from Anamaboe; it is situated upon a hill, and affords the pleasantest prospect on the whole coast. You may anchor off it in 7 fathoms; the fort bearing nearly N.W.†

The land hereabouts is generally bare, with some bushes; hills are visible in the background from time to time, some of which are in the form of sugar-loaves. The coast from Anamaboe to Tantumquerry is a straight line on the same parallel, and off it the depth is less than elsewhere. Several villages are scattered along it, where there is no doubt but that refreshments might be got.

"The fort of Little Cormantine is one of the best positions on the whole of the African coast. It is built on a perpendicular rock, 100 feet high, washed at its base by the sea. The village is a wretched *kroom*, as villages are termed, containing 500 or 600 inhabitants, who live chiefly by catching fish, which they carry to Anamaboe."—*Duncan.*

To the eastward of this are some other villages bearing the same name, near to one of which are the slight remains of Fort Amokou, formerly held by the French.

"Cormantine is in a very grand and romantic situation. It is more regularly built than Little Cormantine."—*Duncan.*

Tantumquerry Point is 6 leagues to the East (*true*) from Cormantine. The abandoned British Fort is just to the north-eastward of the point. The coast about the point is foul, and there is a reef off shore. Off the fort you may anchor in 9 fathoms. The shore eastwards turns abruptly two or three points to the northwards. At 3½ miles are the ruins of *Monfort*, which make like an islet. Some houses near it are called *Gammah*. *Apam* * is above 2 miles farther.

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* Travels in Western Africa in 1845-6, by John Duncan, formerly of the 1st Life Guards. Vol. i., p. 45.

† Cormantine, the first fort possessed by the English, was built by them about the middle of the 17th century. It was taken afterward by the Dutch; and, being stormed, was almost destroyed by the Ashantee army before it attacked Anamaboe. The situation is very commanding.—*Bowdich.*

Whinebah, or SIMPAH, formerly distinguished by an English Fort, is 13 miles to the eastward of Tantumquerry. The fort was abandoned and destroyed in 1812. At 4 miles eastward of Apam is the *Devil's Hill*, a high conspicuous mountain, close to the sea side. Near this hill the anchoring ground is very good in 8 or 10 fathoms, with the hill bearing N.W.; but in 18 or 20 fathoms the ground is very foul.

From Whinebah there is a communicating path to the commercial town of *Kibbees*, in the country of the gold mines; and on the East is a small river, the water of which is good, if filled at a proper distance from the sea. The natives require a small duty for watering.

Barracoe, or *Seniah*, having a small fort abandoned by the Dutch, is situated on the side of a woody hill, with some rocks before it, at 3 leagues to the eastward from Whinebah. It is easily known by the double hill, 770 feet high, called the *Paps* which stands inland, at 3 leagues to the North (*true*) of it.

From Barracoe the coast trends nearly East [*E.N.E.*], 7 leagues to *Accra*, or *Inkran*,† and about 2¼ leagues westerly from that place, is a small stream called the *River Sakkoom*, with a village of that name on the eastern side; and on its western is a little round hill called the *Cook's Loaf*. Having passed this you will descry the high mountains inland, called the *Tafou Mountains*; then you get even land of a moderate height, as far as Accra.

ACCRA, or **Akkrah**.—In a former page we have given a sketch of the events which have led to the purchase and occupation by the British Government of the Danish interests in Accra, so that it is now the only regnant power; the Dutch fort being abandoned and in ruins. The actual extent of territory belonging to the British at Accra was very limited; but the influence extended a great way, say to Whinebah, 20 miles to windward; to leeward, the Danes had all, excepting one considerable town, Pram Pram, about 20 miles from this, and where there has been a small fort, or redoubt. There are no towns in the neighbourhood, except the Dutch adjoining, and the Danish about 2 miles to leeward; there are other considerable towns in the interior, which, before the British occupation, mostly acknowledged the Danes. The black population here amounts to about 3,000. ‡

It is to Dr. William Frederick Daniell, of the Army Medical Staff, that we owe by far the most complete account of the natives, customs, and capabilities of Accra or

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* *Apam*, the Dutch settlement next eastward of Cormantine, has been abandoned; as have, also, all the Dutch settlements eastward of Accra.

† The Portuguese first settled at Accra, about 1492; but exercising the greatest cruelties and enormities, were extirpated by the Accras, who executed the governor and his countrymen, on a spot whence they still take the earth to rub on a new-born child, in commemoration of the event.—*Bowdich*.

This place has been described as the most pleasant and healthy British settlement on the Western Coast of Africa.

‡ Akkra is famous for its goldsmiths' work. "The artificers at the goldsmiths' shops are all native negroes, taught the art, no doubt, by the Spanish and Portuguese original settlers of those nations. A score of them at work in a shop would really be a picture worthy the pencil of Loraine. Some assaying, some melting, others blowing fires with small bellows, more hammering on Lilliputian anvils; others portioning with charcoal, and more fashioning chains for rings or bracelets. As the majority of them are poor, the gold is generally brought by those who want to get the ornament fabricated, which can be done to any design or pattern."—*Hutchinson's Impressions of Western Africa*, p. 69.

Akkrah, as well as of other portions of the Gold Coast. From his communication to the Ethnological Society of London, we derive the following:—

The Akkrahs at present only occupy a territory between the Sakkoom eastward to the small town of Tashia, not more than 15 miles in extent. From the Sakkoom westward the confines are formed by the numerous Fanté provinces; on the North the two tributary kingdoms of Akim and Acquapim; to East and N.E. the Adampé, Aquamba. and Krepe races predominate. This small tract of coast is called by the natives *Ghân* or *Ghâ*, very difficult of pronunciation. By the Fanté and other Inta nations, it has been called *Inkran* and *Inkara*, a term perhaps derived from the numerous ant hills which abound here. The principal towns are three, N'glish or English Accra, Kinka or Dutch Accra, the largest and most ancient, and Ossu or Danish Accra, now belonging to the British.

"The country in the neighbourhood of these towns presents a pleasing and diversified aspect, stretching far and wide; a succession of long and verdant uplands gradually emerge from the coast, which, as they ascend inland, become broken into a variety of gentle undulations and continuous slopes, adorned by a woodland scenery, extremely beautiful and picturesque. Advancing still deeper into the interior, these in time partake of a more mingled character, and are ultimately plended with the elevated mounts and prominent highland visible in the distance. In these localities the soil is exceedingly rich and fertile, the native plantations or farms producing almost without the aid of human labour, that abundance of food which so bountifully supplies the necessities of all ranks of life.

"In the lowland regions adjoining the ocean, the land is partially divested of those primeval forests and luxurious underwood observed in other parts of the coast, and somewhat resembles one of those irregular prairies of Southern Africa, which, clothed with lank grass and a few flowers, are dotted at intervals by isolated thickets and occasional clumps of trees." *

Our limits will not allow us to do more than allude to the admirable and interesting account of the natives; in the work quoted below will be found ample particulars of the manners and customs—as dress, cleanliness—at births, marriages, deaths; the law of inheritance, division of time, currency (which we further extract), architecture, markets, harvest festivals, &c.; a paper which embraces so wide a range, and so elaborately finished from personal observation, stands alone in African Ethnography.

Accra has been a place of very considerable trade, and distinguished by three forts, British, Dutch, and Danish. The first is *Fort James*, the second *Fort Crèvecœur*, and the last *Christiansborg*. The latter was the chief settlement, or head quarters, of the Danes on the coast prior to its purchase by the British. Large quantities of ivory are obtainable at Accra, as well as gold, which the natives manufacture, in their simple way, into a variety of beautiful trinkets. The neighbouring country presents an agreeable and varied prospect, but is scantily supplied with water; although game, with all sorts of provision and stock, and excellent maize or Indian corn, abound.

The surf here is frequently very heavy and high on the beach; landing is therefore difficult, and the anchorage outside is foul. In anchoring before Accra, the red spots, seen on the sea side, are generally brought to bear North, and you lie in 7 fathoms, sandy ground; but the best anchorage is described to be with the English flagstaff N. by W. ½ W., in 6 or 7 fathoms, sandy bottom, at 2 miles off-shore. With Fort James North, there are 8 or 9 fathoms, very soft clay, which renders it necessary to come-to with a light anchor, as it is almost impossible to extricate a heavy one, when once immersed in the ground.

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* On the Ethnography of Akkrah and Adampé, Gold Coast, Western Africa, by the late William F. Daniell, M.D., F.R.G.S., Assistant-Surgeon to the Forces, &c., in the Edinburgh New Philosophical Journal, 1852, Vol. lii., p. 289 et seq.; Vol. liii., p. 120, and p. 333 et seq.

M. le Comte Bouet-Willaumez thus describes Accra :—Within the space of 2 miles stand the three forts of Akra; the first is the English; the second the Dutch, an abandoned ruin; and the third the Danish. The English fort of St. James is recognizable by the whiteness of its walls; three tall palm trees a mile before the fort also serve to distinguish it. You may anchor to S.S.E. of the fort flagstaff in 6 or 7 fathoms, about a mile off, on a flat of fine sand. Fort St. James is an irregular square, flanked by bastions. The European houses are spacious and comfortable, and groups of houses extend around the fort. Fresh provisions of all sorts are to be had at more reasonable rates than those to westward. Water can hardly be got but from the cisterns of the fort. The landing-place is not always accessible to boats, so that canoes are best.

Leaving Fort St. James, you pass before the ruins of the Dutch fort of Crèvecœur, hardly a cannon shot off Fort St. James; you may anchor off its flagstaff in 5 or 6 fathoms water, a mile distant, but in the stormy season it is better to do so farther off. Fort Christiansborg, the principal of the Danish establishments, is a strong citadel, attesting the ancient maritime splendour of Denmark, but it is decaying. Near the fort is a very populous village, intersected by very dirty lanes. The market (well described by Dr. Daniell) is the best of any among the European establishments, and may be reached by horse or carriage from St. James' by a good and well kept road.

Some care is required in choosing an anchorage, for a French ship nearly lost an anchor in 1863, by dropping it on a rocky bottom, which was covered with sandy mud. From the spot the English flagstaff bore N. 27° W., the Dutch fort N. 16° W., and Christiansborg Fort N. 32° E., by compass, and the depth 7 fathoms.

GENERAL CAUTION.—Mr. Finlaison says that those leaving Cape Coast Castle for Accra, should be very careful that they do not overrun their distance; for if they should happen to get to leeward, it will take them some time before they work back against the swell of the sea and strong current. He recommends, that, if a ship leaves Cape Coast in the night time, it should not run more than two-thirds of the distance.

At Accra the tide rises 8 feet, spring tides, The current sets, in general, to the eastward, except in the Harmattan season, which is about the middle of January.

Beyond Christiansborg, 12 miles distant, is the ruined Danish fort of *Temma*; 5 miles further is that of *Poree*; the latter ruins being on a high hillock. The land continues to be arid, bare, and only clothed with low bushes.

Pram Pram is a considerable native village, and large whitewashed houses stand on the hill, which overlooks the site of the ruined English Fort Vernon. Should you anchor before this, it is necessary to sound carefully to avoid the rocky ledge, 12 miles long, which extends from the shore off Poree to 4 miles off, at its East end.

Ningo.—At 2 leagues eastward from Pram Pram is the large Danish Fort of *Ningo*, now in ruins, which may be known by a ridge of hillocks to the eastward of it. The anchorage on the coast between these places is in general good, in from 9 to 6 fathoms, bottom of gravel and sand.

To the westward of the fort is the little river of Ningo, which descends from the inland mountains called the *Crobo Hills*, a high range about 8 leagues inland. Of this range the summit is remarkable, being in the form of a great sugar-loaf, and called *Ningo Grande*, 1,431 feet high.

From Ningo, eastward, the coast is low, being very little above the sea; and it thus extends nearly to the River Volta.

The people of Ningo, or Ningpo, speak a language different from that spoken to the westward; it is called *Adampé*, the name given to their country. The people of the Crobo Hills, though few in number, have hitherto baffled the Ashantees, by quitting their croom at the bottom of the mountain; the latter being of great height, rugged, accessible but by one narrow path, and with springs of water on the top. From the summit they roll down upon their enemies the large stones and fragments of rock which abound there.

Beyond Ningo the coasts become still lower. It is a sandy beach crowned with a line of bushes, the uniformity of which is here and there broken by some palms or dead trees. Before reaching *Occo*, 22 miles from Ningo, this aridity becomes still more monotonous, and the beach becomes only a line of sand with blackish tufts. It is a narrow tongue separating the salt lake which communicates with the Volta from the sea. Outside it is a second line of breakers. Occo stands on this sandy beach.

RIVER VOLTA.—Seven leagues eastward from Ningo is the River Volta, where the Gold Coast terminates. The land is so flat, that it is difficult to know the place, especially in coming from the westward, for then the river is not seen till it bears N.N.W.; when you descry the island, which lies within its entrance. Tree Point, the South point of this island, brought to bear N.N.W. magnetic, leads into the river.

In running along shore for the River Volta, you will soon know when you are abreast of it, as the water changes suddenly to a dark olive colour; regular soundings all the way, and the current setting strong round the Cape St. Paul. About Cape St. Paul the land is very low, and you will not see it more than 4 leagues off; it is covered with trees.

Rio Volta received that name from the Portuguese, on account of the velocity of its stream. It pours such a quantity of water, that its quality is not altered at a great distance in the sea; and the colour, as well as the taste, differing from the common sea water, indicates with certainty the velocity of the river. The river was surveyed in 1861 by Lieut. Dolben, and he found a depth of 11 to 29 feet on the bar. There are high breakers at the mouth of the river, which is only 1 mile wide, and has two bluff points: one to the West, called Sandy Bluff, on which are three palm trees; the other to the East, named Woody Bluff. When you come into the river, you must run in from the East side, within the breaking, as the water lies very plain in that place. Before the river is a flat, extending 3 leagues into the sea, with from 5 to 9 fathoms, soft muddy ground, which is cast off by the stream.

The entrance of the Volta has been surveyed by Mr. Finlaison, from whose survey it appears that the western point of the entrance is a tongue of land, 5 miles long, in the general direction of the coast, and having on it a little fishing town. *Adda Castle*, or Kongenssteen, the Danish Fort, is on the western bank of the river, at 11 miles up from the entrance: it is now in complete ruins. The country between is low. The town of Adda has about 8,000 inhabitants. The best entrance to the river, having only 2 fathoms on the bar, lies within a mile of the western point. The course thence, to a little island within the river, is E.N.E., and then N.E., and North to Adda Castle. The depths are 3, 4, 2, 4, 3, 1¼, 2¼, and 3 fathoms, all toward the western shore, leaving three woody islands on the eastern or starboard side.

Ataku, or AT-AKKOO, is the nearest slave-trading port to Accra, 55 miles distant, on the East bank of the Volta. This was formerly a small fort belonging to the Danes, who claimed the intermediate territory between this and the Fort of Quitta, 30 miles to the eastward. On their establishments at these places being broken up, it fell into the hands of the natives, and subsequently was occupied by a Spaniard of the name of Mannea, as a depot for slaves. The surf here is generally so bad as to make landing highly dangerous.

CAPE ST. PAUL.—From the Rio Volta the distance to Cape St. Paul is 5 leagues. The coast between is low and broken; and the point is covered with trees, as already noticed. At nearly a league to the westward of the point is the entrance of the *Rio Secos*, or Dry River, which runs inland nearly parallel with the coast, and communicates with Lake Popoe, &c., as shown on the charts.

REMARKS UPON THE APPEARANCE OF THE LAND FROM THE FORT OF BOUTRY TO CAPE ST. PAUL, THE SHIP STANDING ALONG WITHIN 5 AND 6 MILES OF THE SHORE. BY CAPTAIN R. WAUCHOPE, R.N., H.M.S. THALIA.

To the eastward of Fort Boutry the Fort of *Secondee* is seen. Its appearance from the sea is that of considerable strength; it stands close to the water, built upon a bank of horizontally stratified sandstone, of a reddish colour, surrounded on all sides, except that of the sea, by thick wood. A narrow sandy beach stretches to the East and West of it. The bare rock again appears at the termination of the beach to the eastward, and is seen in several places within 8 or 10 miles from the fort, in this direction, and then a densely wooded coast.

The next fort is the Dutch Fort of St. Sebastian at *Chama* or *Assina*. This is a large white fort, surrounded by natives' huts, having a long narrow slip of white sandy beach to the West of it. The beach is broken to the eastward for about 3 miles, by the wood extending to the water's edge; when again a long narrow beach continues for 8 or 10 miles, and the red cliff is seen, bare of vegetation in several places. The land not high, but entirely covered with low wood.

The next fort is the Fort of *Commenda*, or rather the two forts. They may be seen at the same time with Chama. One of the forts, of a dark grey stone, a square building, seemed to be in tolerable repair; the other, about a mile to the eastward, was a complete ruin. A number of native huts were near the forts, and a great number of canoes were hauled up on the beach.

From thence to the eastward, the two large and magnificent-looking forts (Dutch) of *St. George del Mina*, or Elmina, make their appearance, as if newly whitewashed, and are of a dazzling white. On approaching them we observed, about half a mile apart, two other small forts; the one to the westward being round, and the other square. The western large fort is situated upon a rising rocky ground, about 70 feet above the level of the sea. The eastern large fort stands on the beach, in the middle of a considerable-sized village. Some of the houses are of stone, but it chiefly consists of miserable-looking huts. To the eastward of Elmina, the same low, undulating, wooded line of coast stretched along, with a narrow strip of sandy beach.

Soon after Elmina is clearly made out, the round tower (Phipp's Tower, now Fort William) of Cape Coast Castle is seen rising magnificently from the sea; it is built upon rising ground to the rear of the castle, and is the first object which is seen. On approaching, the handsome and extensive castle of Cape Coast is clearly seen; and, on landing, the interior does not disappoint expectation, as the whole of the buildings are in admirable repair. A few miles to the eastward of Cape Coast Castle the ruined English Fort of *Moree* is seen. The mud huts of the natives still surround the square brown ruin. Still further to the eastward the small Fort of Anamaboe is seen. The appearance of the coast is similar to what we have already passed, viz., a narrow sandy beach, rocky in some places, and low undulating hills, covered with low underwood behind.

A few miles to the eastward is the ruined, square, and brown Dutch Fort of Cormantine, situated on a pretty rocky green hill, close to the sea. The natives' huts extend to the westward of the fort, and to the eastward the same description of coast as that above mentioned. At 5 leagues to the eastward of Cormantine *Tantumquerry Point* is seen; it is low and rocky. There is a reef of rocks lying about a mile to the N.E., on which the sea was breaking when we passed it. On first seeing the point, one fort only is observed; on approaching, another square brown fort, nearly joining the former, is seen, and the low land becomes visible beyond the *Devil's Hill*, which is the highest hill on the coast between Cape Three Points and Accra.

When abreast of Tantumquerry Point, the Fort of *Apam* is seen to the left of Devil's Hill; a brown ruin of considerable size. A large native village surrounds it, except to seaward. Along this whole line of coast (for we have run it down within from 4 to 6 miles) there are native villages to be seen at intervals, consisting of thatched mud huts. The next fort is that of *Whinebah*, now in ruins. When abreast of this you can just see Tantumquerry Point, and the fort, to the westward, and *Barracoe Point* to the eastward. Whinebah stands upon a low line of hills, having nothing particular to mark it, except a whitewashed thatched house of considerable size on the beach, and the ruins of a fort a little to the left. There is high land in the distance.

The next point is Barracoe Point, with a very remarkable palm tree upon it; and to the eastward of it, considerably higher than the low land, the peculiarly shaped double hill called the Paps, is seen in the distance. This and the palm tree point out its situation very distinctly. On nearing the Point, the fort, and flagstaff, and native village, are seen, and the distant coast beyond, terminating in a very low point.

On rounding Barracoe Point, the Paps are much more distinctly seen, being much nearer; and the remarkable hill called the *Cook's Loaf*, a conspicuous round hill, is seen close to the sea.

ACCRA.—The land to the West of the Cook's Loaf appears very low, and to run out to a very low point, having still the very narrow strip of sandy beach; and on the point the three white forts of Accra are seen, and a fourth, the Danish, 3 miles to the eastward. The English and Dutch are within a mile of each other; so that the coast about Accra is particularly well marked.

We sailed from this on the 17th November, and on the 18th hauled in for the land, and found ourselves in the morning abreast of Ningo, a Danish fort. It is a good-looking whitewashed fort, apparently in good repair, about 7 miles off-shore. The water shoalens to 7 and 6 fathoms; a little further out, 12, 13, and 14 fathoms; and all the land seen to the eastward appears very low indeed.

The marks for Ningo in the Sailing Directory are some hillocks to the eastward, and the high conical mountain of Ningo Grande inland; the hillocks I could not make out clearly. When abreast of Ningo, a small fort is seen to the westward, which is, I suppose, the fort of Pram Pram. There is the same narrow line of sandy beach, as we have observed all along, to the eastward of Pram Pram still. Another white house or fort may be seen when abreast of Ningo. To the eastward, the tops of trees only are to be seen, the land being so low. Six and seven miles from the shore, the soundings along the coast are 11 to 13 and 14 fathoms, coarse sand, and in some places rocky bottom.

A great quantity of sea weed was seen to the eastward of Ningo; the first we met with on the coast. Abeam of us, about 1ʰ p.m., some miles to the eastward of Ningo, observed a flagstaff, and two large thatched houses; a number of naked negroes; and on the beach was a great deal of surf. The wood on the coast here consists chiefly of a peculiar kind of palm, the stem similar to the cocoa-nut tree, but the upper part more bushy, and similar in appearance to the silver tree at the Cape [*Good Hope*].

At 3ʰ p.m., 18th November, saw the mouth of the River Volta, bearing N.N.W. It is on this bearing alone upon which it can be seen. The two bluff heads at the entrance appear very bold, and make the mouth of the river very obvious. In standing along to the eastward, the entrance was not seen above five minutes, as it was soon shut in by the eastern bluff.

The whole coast to the eastward of the Volta, to Cape St. Paul, is very low; nothing but trees are seen. In 9½ fathoms off the Cape this is its appearance; nor could the Cape itself be made out, except from the trending away of the land to the northward.

V.—THE BIGHT OF BENIN, FROM CAPE ST. PAUL TO TERRA FORMOSA.

Its western point, Cape St. Paul, has been described; its eastern extremity has been called *Cape Formosa.* In both cases the appellative *Cape* has been most improperly applied; for these extremities, as well as the intermediate coast, are very low. It has, moreover, been determined by survey, that on the eastern side there is not even a projecting point to which the characteristic of *Point* can apply. This is the reason why different spots of land have been from time to time assumed as the *Cape*, and misrepresented accordingly.

The whole of the coast, between the Rivers Benin and Old Calabar, is very low and almost uniformly level land; the only visible inequalities being caused by the growth of the trees, which in many places spring up out of a swamp; the land being overflowed at high water, in some parts, for miles. Near the sea coast are numerous creeks, navigable by large canoes and forming a communication between the above rivers; and I have been assured, even as far as Lagos and Whydah. To use the words of Dr. Boyle, in his work on Fevers (I quote from memory), "This coast is forbidding in its aspect, dangerous to approach, repulsive when examined, and disgusting when known."—*Capt. T. Midgley.*

QUITTA, &c.—The former Danish, but now British Fort of *Quitta*, is 4½ leagues to the N.E. of Cape St. Paul. It is nearly abandoned. The land between is low and marshy, almost even with the surface of the sea. The fort is included in an independent State of Kerrapay, called *Agwoona*, which extends thence along the coast to the Volta. There are six towns[*] between, the principal of which is Agwoona, and the caboceer of this place is supreme over the others, but not absolute.

Plenty of stock, &c., can be obtained at Quitta; and there is also a good anchorage in 5½ fathoms, fine sand, with the fort bearing W. by N. 2 miles.

Between Quitta and Popoe are four Kerrapay towns, governed by carboceers, independent of each other, as well as of Agwoona. From Quitta to *Acquijah*, the distance to the N.E. is nearly 3 leagues; and it is nearly the same from the latter to *Paurey*. The coast flat all the way. From Paurey the coast trends easterly to Gugligou, 4 leagues. The last may be known by four hills on the coast to the eastward of it,—the only eminences hereabout, and from which the town called *Little Popoe* is *true East*, 4 leagues.

Before reaching Little Popoe, the coast loses its aridity and becomes green and wooded at the village of *Fish Town*, but after passing this it again becomes the barren sand, bare of vegetation, except a few stunted trees; and before seeing Little Popoe it becomes entirely bare of vegetation. The mass of blackish houses at the latter place, therefore, are very plainly to be seen: a few palm trees only are to be seen near it.

POPOE.—From Quitta to Little Popoe, about 12 leagues E. ¾ N. [*N.E. by E. ½ E.*] the coast, rounding regularly, forms a bight, in which from 7 to 15 fathoms may be found at 4 leagues from the shore.

Little Popoe[†] is, or rather was, one of the most extensive slave factories on the coast; it is close to the water side, and has a very bad beach to land on. The Dutch once had a factory here, but no sort of fortification. A little river, the mouth of which is choked up with mud, runs by the town, within the beach; but fresh water is not to be got off without great difficulty. You may anchor, with the town bearing North, in 9 or 10 fathoms, coarse white sand.

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[*] "The Spanish and Portugese names of the places on this coast, are the remnants of the former extensive slave trade carried on by these nations, and are often confounded with the native names. Thus the names of Padiena, Mina Chica, Cogmoa, Port Seguro, are confused with those of Dumfiou, Pawrey, Guigliou, and merely designate half a dozen unimportant villages lying between Quitta and the large village of Little Popoe."—*M. le Compte Bouet-Willaumez.*

[†] Thirty miles East of Little Popoe is Whydah, and 80 miles East is Lagos. These two ports are the greatest slave depots in the world. I have seen 13 vessels lying in the former place at one time.—*Captain Broadhead*, 1841.

A lagoon, navigable for canoes, extends parallel with the whole of the coast of Benin. It is separated from the sea by a tongue of sandy land of very variable breadth, and consisting sometimes of pure sand. At Little Popoe this sandy neck is not more than 2 cables' lengths wide; the native village is built on it; and the European factories are erected on the opposite side of the lagoon; their white walls are not visible till the meridian of the village is passed, and then they appear as if connected with the native houses. The bar of the beach is more accessible at Little Popoe than elsewhere, by means of the country canoes.

Great Popoe is 7½ leagues E. by S. [*E.* ¾ *N.*] from Little Popoe; and 4½ leagues further, in the same direction, is WHYDAH. The coast between is low and swampy, spotted here and there with trees. Great Popoe stands on the West side of the entrance of the river, falling from Griwhee, and which is 4 leagues to the eastward. Maize in any quantity, and very cheap, may be obtained at Popoe. The bar being bad, with a high surf, requires occasional attention as to the time of landing.

WHYDAH.—The Hu-ta, or Sea-beach of the "Liverpool of Dahomé," is a sand-bank rising some 20 feet above the sea-level, and bright with the usual salsolaceous plants. There are no dwelling-houses, nor do the white merchants of the upper town often sleep here. Seven several establishments of mat roofs and mud walls (the French being incomparably the best) serve for the storing of cargo, and for transacting of business during the day. There are usually three to four ships rolling in the roads, and the more sanguine declare that the great slave port might, if she please, export 10,000 tons of palm oil (340,000*l.*) per annum.*

Whydah itself is from 1½ to 2 miles distant from the beach; the road to it is across the West lagoon, 300 yards broad, and salt only when the sea flows into it at high water. Fish and oysters excellent. A detestable road over swamp sand and brings you to the town of Whydah, which is about 2 miles long by half a mile broad, which has been said to contain 30,000 people, but probably has about 12,000. It has four European forts—French, Brasilian, English, and Portuguese, in the order of seniority. "Factory" or school would be a better term for them than fort. The place is graphically described by Capt. Burton in his work quoted.

AGBOME, the capital of Dahome, is about 62 miles, marching distance, from the roads of Whydah, and 1,065 feet above the sea. Its barbarous monarch reigned supreme over the surrounding region, and his annual "custom" was represented to the world as being accompanied with most barbarous slaughter of human victims; the number of which it is likely were greatly exaggerated. It was the object of Captain Burton's mission to King Gelele, in Dec. 1863, to endeavour to put a stop to the sacrifice of human life, and also to the slave trade. His well-known work before alluded to gives by far the best description of the region and its inhabitants.

Two leagues to the westward of Whydah Road lies, on the flat shore, a remarkable hillock, called *Mount Palaver;* and 1 league westward from it you perceive three or four groves of trees, the westernmost of which is the largest. In the middle of these groves stands one tree, of a prodigious height, appearing at a distance like a tower. There stand also, about a league westerly from Whydah, close to the sea side, two trees, with great round tops, which are called the *Two Brothers.* These trees serve as a good leading mark for the town, off which there is a convenient roadstead in 8 and 7 fathoms, muddy bottom, 2½ miles from shore, with the town N. by E. and the Brothers N.N.E.

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* Capt. R. F. Burton's Mission to the King of Dahomé, 1864, vol. i., p. 32.

"On my passage," says Captain Midgley, "thence to the Whydah, I kept a good look-out for *Mount Palaver* and the *Two Brothers*; but for many miles to the westward of Whydah could make out no particular whereby to distinguish the coast. Whydah is, however, easily found, as there are always vessels lying in the Roads; but, should this not be the case, keep the beach in sight from the deck, when several low houses or sheds, with a high flagstaff, will be seen close down upon the beach; and, with a good telescope, the town will be seen from the deck, about 3 miles inland. Anchor in any depth you choose with the flagstaff N. by E., or North, as the ground is all clear and good. No ship's boat can land here.

To the eastward from hence stands a thin wood, which extends along shore to a great distance.

After leaving Whydah you must, to make out the points connected with the villages, keep very close in-shore. Some of these villages are very considerable, and are more or less embosomed in trees.

GRIWHEE, or GREWHE, is represented as containing 6,000 or 7,000 inhabitants. In passing to it from the sea shore, near Whydah, a lagoon is to be forded, which is a quarter of a mile over, and the same distance from the beach, to which it runs parallel westward, and communicates with the sea at Popoe.

The country surrounding Griwhee is fertile, open, and level, exhibiting large savannas covered with high grass, although in some parts thickly wooded with fine grown trees. To the North of the town are some well cultivated lands, producing peas, calavancies, maize, and yams.

The ounce and ackie system still prevails, and requires nearly the same assortment of goods as to windward; but the trade is transacted on shore.* In running along the coast to the eastward from Popoe, in 8 fathoms, Griwhee Town may be seen from the deck, by means of a good telescope, at about 3 miles from the beach, there being scarcely any wood to intercept the view; and thus you can easily gain the anchorage of Whydah. From Whydah the coast trends E.S.E. ¼ E. [*East*], 27 leagues, to *Lagos*. In this course, at the end of the first 7 leagues, you come to *Appi*, or *Appee*, formerly a kind of English factory,† the village is about 4 miles inland. Between it and Whydah lies *Jackin*, a small town upon the beach, which has ceased to be a place of trade.

PORTO NOVO.‡—At 3 leagues eastward from Appee is *Porto Novo*, distinguished

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* See Lieut. Bold, page 61, and Adams, page 106. Little gold is seen to the eastward of Accra, as the country does not produce it, and the use of it is almost unknown to the natives of Whydah, Ardrah, Lagos, and Benin.—*Adams.*

† About 15 miles West of Whydah is a fort named *Appi Vista*. For the whole right and liberty to trade in palm oil in this place—I have been informed, on good authority—one of the oldest and most celebrated slave-dealing residents there, gives the King of Dahomey something near 10,000 dollars a year. That such a sum should be paid for this exclusive privilege shows the importance of the locality; and the iniquity of the monopoly is further proved by the fact that the king binds all his traders to give palm oil to this man, and to him alone, at the price fixed on by his majesty.—*Hutchinson.*

‡ This place, with Whydah, were the slave-exporting places of Dahomey, the king of that place having obtained great influence over the chief of Porto Novo. This influence, backed by the representative of some Brasilian traders, led to much interference with British interests, contrary to treaty, the privilege of trading and erecting factories being denied to them. This rose to such a pitch in 1860—1, that Consul H. G. Foote determined to attack the place. H.M.S. *Brune*, with 17 men, under Commodore Wratisland, with two other vessels, steamed up Badagry Creek, February 21st, 1861, and reaching Porto Novo, they were sharply attacked on the 25th, but the threatened punishment was not then inflicted.

In consequence of a continuance of aggressions, on April 26th, the place was attacked by huts on the shore. Porto Novo is, therefore, 10 leagues to leeward of Whydah. Here you may anchor before the town, in 7 or 7½ fathoms, black clay, with shells.*

The town of Porto Novo itself stands like most of the other places on this part of the coast, on the North side of the river or lagoon, that forms a long line of inner navigation up to Benin and the Niger. The Porto Novo lagoon is to the westward of the town, and is 8 miles inland from the huts on the sea shore.

BADAGRY.—At about 5 leagues eastward from Porto Novo is the roadstead of BADAGRY. The town of this name is 1 mile from the beach, and situated on the North bank of the lake or river that runs parallel with the coast to Lagos, and is at Badagry about 200 yards broad. A shrubbery intercepts the view of the town, until the river is very nearly approached. The anchorage in the road is pretty good, in 6½ and 7 fathoms.†

The *inland water communication*, which extends from Porto Novo, and also with the Whydah lagoon, still further West, was examined by Captain Glover, R.N., in 1858—62, and his sketch survey first showed its very peculiar features. It is generally very narrow, from one-eight to one-quarter of a mile, with depths varying from 20 to 10 feet, and in some parts with only 6 feet depth. All the villages and towns are situated on the *North* side of this lagoon or river.

LAGOS.—*From Badagry* to the mouth of the *River Lagos*, a distance of 34 miles the whole coast is low, marshy, and very unhealthy. It is bordered all along with palm trees, and the landing is rendered dangerous by the high surf; besides it is much subject to heavy rains and tornadoes. These may be foreseen by the great thunder and lightning, with the rising of black clouds, which commonly precede them. Then it is best to hand all your sails, except you foresail, which you may keep in the brails, to command your ship, and run before the wind during the tornado, for what you get is to windward.

The town of Lagos [*Ichoo*] is large, contains about 5,000 inhabitants, and carries on an extensive commerce, both in the interior and on the coast. The island on which it stands is very low, being a few feet only above the level of the lake at high water. It swarms with water rats. The necessaries of life are here extremely abundant and cheap.

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and burned, and it is supposed 500 out of the 10,000 defenders were killed, the British loss being only 1 killed, and 5 or 6 wounded. This deserved retribution had a good effect.

* M. le Comte Bouet-Willaumez states that he broke open a closet abandoned for half a century, at Whydah, in 1839, when he found from documents that Porto Novo was a dependence of the French establishment at Whydah.

† Richard Lander, in the Journal of his Expedition to explore the course of the Niger, has given a pleasant account of his sojourn at Badagry, where he landed in 1830. On the 22nd of March he debarked from on board the *Clinker*, and having been taken into a canoe, at the edge of the breakers, it plied over a tremendous surf, and was flung with violence on the burning sands. He was then conveyed by a native canoe through an extremely narrow channel, overhung with luxuriant vegetation, into the Badagry River, which he describes as a beautiful body of water, resembling a lake in miniature; its surface being smooth and transparent as glass, and its picturesque banks shaded by trees of a lively verdure. Landed on the opposite side, where the road lay over a magnificent plain, on which deer, antelopes, and buffaloes were seen. On proceeding, various groups of people were passed, who were seated under the spreading branches of superb trees, vending provisions and country cloth. The town was exceedingly populous, and people were found vending a variety of articles at every step of the way.

The natives procure the necessaries of life chiefly by fishing, and the cultivation of the yam and Indian corn. Oranges, limes, cocoa-nuts, plantains, and bananas, are produced in abundance in the neighbourhood.

Lagos was the scene of some determined warfare against its king, Kosoco or Coçioco, in 1851 and 1852. It having been determined to put down the slave trade, the British cruisers in vain endeavoured to effect this object by peaceable means, and the boats of the cruisers were forbidden to come up the river to Lagos. On November 25th, 1851, a force of 260 men in 23 boats, under command of Commander Forbes, of the *Philomel*, entered the river. They were preceded by Mr. Becroft, carrying a flag of truce. A most determined resistance was made by above 5,000 people, and the expedition was immediately exposed to a sharp fire of musketry. A landing was effected, but the fire was kept up on them so effectively that they were compelled to retreat, after firing some houses, with the loss of two killed and several wounded. This ineffectual attempt led to another, under the command of Captain R. W. Bruce, of H.M.S. *Penelope*, in January, 1852, which annihilated the power and means of this bold chief.

As the mouth of the river is shallow and dangerous, and many boats belonging to English vessels have been lost on entering it, the French and Portuguese, more prudent, land their goods from canoes upon the beach to the eastward of the river's mouth, and pay the portage to the town. They also warp the fresh water for the use of their vessels through the surf, rather than risk the lives of seamen by sending boats into the river.

The port of Lagos is now only 500 or 600 yards wide at the entrance. The Bar is formed of hard sand, which commences close to its mouth, and extends about 400 yards to seaward, and is so shallow that it is dangerous for boats drawing more than 6 or 7 feet to pass over it. Opposite to the entrance, in the N.W., is the River Lagos, with a smaller river at some distance on each side, East and West.

Lagos occupies a very important position, commanding, as it does, the whole of that interior line of navigation by the lagoon before described. It was therefore, a stronghold of the slave trade, the slaves being collected here from all quarters, could be despatched for embarkation at any convenient point along the whole line of coast it commands.

The town occupies the western end of the island, called Eko (or Ichoo), and stands in front of the entrance of the River Lagos, at about 1½ or 2 miles from the bar. Along its S.W. face are the various European factories, in the middle of which is the English Church, which is in lat. 6° 28′ 21″ N., long. 3° 25′ 50″ E.

The RIVER LAGOS and its surroundings, was first surveyed by Lieutenant Glover, in 1859. He says that the entrance is subject to continual changes, particularly during the rainy season.

The bar is not always practicable, as the *rollers* frequently break and extend to the beach, covering the whole with foam. A vessel intending to cross the bar should first place a buoy close under the outer rollers, to mark the entrance. Having entered the passage, keep close within the outer rollers.

The ebb tide makes down about 3 hours beneath the surface, whilst the stream is running strong into the river. The flood makes up in the same manner to within 1½ hour of high water, before it becomes perceptible on the surface; then it runs with great rapidity, so that a boat can scarcely pull against it.

The Ikoradu Lagoon, corrupted to "*Cradoo*" Lake, is a broad expanse of the interior waters to the north-eastward of Lagos. From that town it stretches for 9 miles to the town of *Ikoradu*, a place of considerable trade, near the mouth of the *River Ogun*, which runs to Abeokuta, 34 miles nearly due North from its mouth. From Lagos it extends with verging breadth to 35 miles to the town of *Epé*, or *Ekpé*.

Abeokuta is a place of considerable reputation. It first excited attention from the visit of the Rev. T. Freeman, in 1842, who found there a number of liberated Akoo slaves, who had emigrated from Sierra Leone, and located themselves in these districts, preferring to remain under the protection of its king rather than reside in the more dangerous and insecure town of Yorruba. The significant title of *Understone* has been bestowed on it by the natives, from the circumstance of its situation amid vast fragments of white granite, which also lie scattered around its outskirts in isolated masses.[*]

It was visited by Captain R. F. Burton, H.B.M. consul, in company with Captain Bedingfield. R.N., in October and November, 1861, who came to the king on a mission, with the object of putting a stop to the slave trade, and the offering of human sacrifices at religious festivals, as had been assented to by the treaties of 1851. The king accorded the new treaty, but broke it immediately afterwards.[†]

The COUNTRY OF THE JABOOS, to the northward of the lake, is inhabited by a fine looking people, " who seem as if they always came from a land of plenty; being stout, healthy, and full of vigour." They are very industrious, and manufacture for sale an immense quantity of Guinea cloths;[‡] besides raising cattle, sheep, poultry, corn, and calavancies, with which they supply their neighbours.

M. de Bouet Willaumez says:—The lake is separated from the sea by a low marshy island, which extends from the mouth of the Lagos to that of the Formosa. or Benin. Several marshy inlets, with but very little depth, intersect this extensive island, connecting the lake with the sea. The island is called, on the old charts, *Curamo*, but by the natives *Ikbekou*. In the lake at the West end of the island are three islands, opposite the Lagos entrance, on one of which is the town of Lagos, or Eko (or Ichoo).

The entrance to the river is obstructed by a bar, which usually separates it into two channels, about 1½ mile in extent. The easternmost of these channels is the shallowest, 7 to 9 feet, but being to leeward of the sandspit lying in the middle of the entrance, it may be used by small steamers when the western channel breaks all across. The general direction over the bar is North by compass. The Western Channel has 10 to 17 feet water on its narrow bar, and the direction over it is about N.E. by N.

It is high water, full and change, at 6^h, rise 3 feet.

From Lagos entrance the shore extends about 27 leagues to the eastward, with very slight inflections, and a sandy strand all along: within land, about 1½ leagues from the shore, and almost parallel to it, runs the river or creek, which, from Benin River enters Ikoradu Lake. It is bordered with trees for about 18 leagues, or as far as the East end of Ikoradu Lake; then it appears naked, the trees standing farther inland, and along the creek. These are remarkable by being red-topped; and they go no farther than the sandy strand; at the end of which is, or was, a tall, spreading, solitary tree. There you may anchor, at 3 miles from shore, in 4½, 5, or 6 fathoms, muddy bottom.

M. de Bouet-Willaumez says that he passed close along this coast, which by the English and French charts has been represented as uninhabited, but found amidst the groups of trees which stood on the shores the villages of *Ybego*, *Obaze*, *Bughiyhe*, *Ochoro*, *Leshé*, *Chision*, and *Esi*, to which succeeded the village of Ode, or Oddy, which is larger than the others, and points out the true limit of Curamo Island. Here is met with the first indication of the efflux of the great River Niger.

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[*] " Medical Topography, &c, of the Gulf of Guinea," by W. F. Daniell, M.D., page 23.

[†] The interesting account of Captain Burton's proceedings is given in the first volume of his " Abeokuta and the Camaroon Mountains, 1863."

[‡] " The cotton shrub, *gossipium herbaceum*, furnishes the raw material from which the celebrated Jaboo cloths are manufactured. These fabrics surpass the British cotton goods in strength and firmness of texture, but inferior to them in fineness of execution."—*Dr. Daniell*, Medical Topography, &c., page 38.

The soundings from the West up to this point are sand; beyond it, to the south-eastward, mud.

All this coast, inhospitable and very little frequented, is, for the most part, drowned occasionally by the sea, or by the heavy rains in August and September.*

BENIN or BINI RIVER, or RIO FORMOSA.—From the tall spreading tree above mentioned, the coast trends S. by E. ½ E. [*S.E.* ¾ *S.*], 3 leagues, to a small fishing town on the beach; and between are several clumps of high trees. The coast continues nearly in the same direction 7 leagues farther, to the entrance of Benin or Bini River, or *Great River Formosa*; and this part shows like a green, low, bushy strand, in front of a thick row of trees, of regular height, and with a few insulated huts or houses. The shore is sandy, and the depths 4½ and 5 fathoms at 2 leagues off, but less off the mouth of the river.

On advancing toward this place from the westward, strangers have been advised to keep on the parallel of 6° N., and make the land near the fishing town above mentioned, and thence stand along shore to the N.W. head of the river; thus they avoid over-running their distance, and making the rivers to the south-eastward, which might be dangerous.

The course from Lagos to Benin River is S.E. [*S.E. by E.* ¾ *E.*], and the distance 32 leagues. In running toward this river, the water in general will be found to have a dark green colour, and be more shallow than any other part of the coast. The current between sets to the eastward and S.E.

According to the late survey of the Bight of Biafra, &c., by Captain Vidal and the officers of the *Barracouta*, the N.W. point of the entrance of Benin River is in lat. 5° 46′ N., long. 5° 4′ E., which agrees very nearly with former results.

Lieutenant Bold states that, since the abolition of the slave trade, the River of Benin has been nearly deserted; the natives having ceased to come outside the bar. This may not, however, be always the case; and we shall therefore subjoin a description of the river, &c.

According to Captain Adams, whose acquaintance with the country was previous to 1800, the country called Benin is of considerable extent, and situated principally to the North and N.W. of the principal river. Into this river, at 3 leagues from its entrance, on the North side, is the mouth of a wide and deep creek, leading to a town called *Gato*, or *Agaton*,† whence it has its name. At Gato, vessels trading with

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* The following note may, perhaps, not appear improper in this place:—

From Sherbro to Rio Formosa, or River Benin (which is the part of Africa with which Europeans are best acquainted), a tract of 1,400 miles of sea coast, there is not one navigable river, bay, or harbour, into which a ship can enter; nor is there one river or creek (the Volta and Lagos excepted), into which a sailing boat can advance 10 miles from the sea; very few of the creeks will even admit a boat; and not one on the Gold Coast, except at Chama and Elmina; a small boat may row up the former about 2 miles, and up the latter about a quarter of a mile.

The shores are, almost in every part, difficult of access, from the heavy surf which breaks upon the beach; it is scarcely possible to land anywhere but in a light canoe, and even in that way it is frequently impracticable for many days together; in many parts, besides, there is, near the shore, scarcely water enough for a canoe: and the breaking of the waves becomes there so impetuous, that all communication between the shore and the shipping is frequently interrupted for three weeks together, and can seldom be effected with safety.—*Dalzel.*

† Belzoni, the celebrated traveller, died of dysentery at Gato, on his road to Haussa and Tombuctoo, November 26th, 1823, and was buried there on the following day. A wooden tablet to his memory still remains (1838). Dr. Daniell says, his grave is now an elevated mound of earth, overrun with weeds, with the fragments of a decayed wooden cross. This has now all disappeared.

Benin have their factories. Craft of the burthen of 60 tons can navigate this creek to within 4 or 5 miles of the town, which is more than 10 leagues distant from Benin River; and the first dry land which appears, after entering, is near Gato—the intermediate country being a morass, covered with an impenetrable forest.

The course of the road from Gato to the capital, Benin, is about N.E. by N., and the road passes over a country perfectly level, intersected with deep woods and swamps.

The face of the country surrounding Benin bears much the same character as that of Ardrah and Griwhee, excepting that it is more thickly wooded. The town is large and populous, containing about 15,000 inhabitants: it is built very irregularly, without any regard to order, and the houses are detached; consequently it occupies a large space.

The king of Benin is fetishe (sacred), and the principal object of adoration in his dominions. He occupies a higher post here than the Roman Pontiff in Catholic Europe, and is considered not only as the vicegerent of Deity, but as a deity himself, whose subjects both obey and adore him as such. But, with all his fine attributes, he seems generally to have treated Europeans with courtesy, especially those armed with acceptable presents. The king and his courtiers are ostentatious in their dress, wearing damask, taffety, and cuttanee, after the country fashion. Coral is a favorite ornament in the royal seraglio, which is always well filled; and the women wear a profusion of beads, if they can obtain them. He was visited in 1838 by Messrs Moffat and Smith, who found him to be a robust old man, who affected much dignity and would not allow them to approach his person. They were hospitably treated, but had many painful proofs of the barbarity of the inhabitants. In several places human remains were exposed in the most disgusting manner.*

The land about the town is fertile, although but little of it is cultivated. Sheep, goats, pigs, poultry, and yams, are plentiful and cheap; there is here, also, a breed of small cattle. Cotton, indigo, and the sugar-cane, appear to be indigenous.

BENIN RIVER is 1¾ miles wide at its entrance from the sea, and has across it a bar of mud, clay, and sand, extending out a league to seaward, and on which there are only 12 feet of water at spring tides. Vessels not drawing more than 9 or 10 feet may generally pass it in safety, by taking the proper time of tide. At a few miles from the sea, this river is only half a mile wide; and, at New Town, or Young Town, which is 6 leagues up, little more than 400 or 500 yards. Two branches near New Town, called *Gato Creek*, and *Warree Creek*, are nearly equal in magnitude to the main trunk; one, running to the N.E., communicates with Gato: and the other with the River Warree or Forçados and other rivers forming a portion of the delta of the Niger, and continues up to the Niger, from which it diverges a little below Eboe. The direction of the main trunk is about E.N.E.; and according to the report of the natives, at about 50 miles up, it is not navigable for vessels of 50 tons. The depth of water in any part does not exceed 4 fathoms.†

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* For an account of their visit, see "Journal of the Royal Geographical Society," vol. xi., pp. 358—9.

† RIVER BENIN.—The following extract is from the voyage of Captain Owen, Vol. ii., pp. 358—9.

"Palm oil and ivory are now the only articles exported in British ships from any of the numerous rivers between the Bonny and Benin; but as this is more profitable when obtained in large quantities, those only that can admit vessels of burden are resorted to, of which the Bonny, Old Calabar, and Camaroens, are the principal; the Benin and other minor rivers being almost deserted, as during our survey we had many opportunities of learning; for people would frequently come off to us when passing some of these, and earnestly request that we would tell the palm oil traders that their jars and calabashes were over-running from want of vessels to take it away.

"This falling off in the trade was severely felt by the people of Benin; and Fish Town, The kingdom of Warree, or Warré, is situated to the South of the Benin River. Its first town, near the Bar of the river, is called *Salt Town*; the second, 2 leagues more to the N.E., is *Bobee*, or *Lahou*; and the third, which is 4 leagues higher, is *New Town*. The last is opposite *Reggio* Town and Point, on the East side of the entrance of Gato Creek, and upon the East side of the mouth of Warree Creek, which thence extends S.E. to Warree, the capital of this state.

New Town, or *Young Town*, therefore, stands about 6 leagues above the mouth of the River Benin, and it is a seaport town of the king of Warree. The captain of the River derives his power and consequence from being placed at Lobou, near the entrance, in order to receive the king's duties from vessels entering for the purposes of trade, and he makes a point of boarding every one that enters.* Since the decline of the slave trade this place has been nearly deserted by traders. The population now amounts to 600 or 1,000, and from its unhealthy situation is exposed to much sickness.

The country between New Town and Warree is covered with an impenetrable forest, which grows upon land that seems composed of alluvion: and, even in the middle of the dry season, water covers a large portion of its surface nearly to the depth of a foot.

The *Town of Warree* stands on a beautiful island, about 5 miles in circumference, and a little elevated above the surrounding country. The island is well cultivated, and has much of the appearance of an extensive park. Its subsoil is a tenacious red clay, of which the inhabitants make jars for holding water, and various other domestic utensils. These are baked in ovens constructed of wood, placed in the open air, and the oven is consumed while the pots are baking. From the great quantity manufactured, it seems that earthenware may constitute a considerable article of trade. The town is divided into two parts, distant from each other about half a mile. The most populous is that in which the king resides, and the total population is about 5,000 persons. Much trade is carried on with the natives of New Calabar and Bonny, to the eastward, who come round in their canoes for the purpose.

The government, says Captain Adams, although monarchical, appeared to us mild. Polygamy is common here, as in other parts of Africa; and the number of wives which the black monarch had exceeded sixty.

At Benin and Warree, when the intercourse is open, much palm oil and ivory may be obtained, and generally much cheaper than either at Bonny, Calabar, or Camaroens to the eastward.† The medium of exchange is salt; but accounts are kept in

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situate near the entrance of the river, was, in March, 1818, burned by solemn edict to the ground, in consequence of the king's fetishe men having persuaded him that this act was necessary, in order to appease the Deity, who had deprived them of their trade.

"The Bar, at its entrance, from being perfectly exposed, and the heavy swell that sets in, is dangerous in bad weather. The natives, with reason, consider it as their greatest enemy: and, like those of Bonny, make human sacrifices to remove it.

"Booby Town, at the southern entrance, together with another on the opposite side, and the neighbouring villages, are under the direction of a governor appointed by the King of Benin, and approved by the King of Warree, whose sovereignty extends over the whole district, and who, by way of distinction, is styled '*The Great King*.'"

* Lieut. Bold adds that, on entering, vessels are boarded by the governors both of Bobee or Lobou, and New Town, with whom a deputy must be sent up to the king, with the usual presents (*Comey*, or *Custom*). The same form is necessary for the king of Benin, if you wish to purchase ivory, the chief produce of his dominions. The governors, it seems, must at once be mistrusted and guarded against, humoured and encouraged; their power being almost uncontrolled.

† For the particulars of trade, see Capt. Adams, p. 109; and Bold, p. 66.

pawns, the value of one of which is equal to a bar in Bonny, averaging from 2s. to 3s. each.[‡]

The BEST ANCHORAGE for vessels without the BAR is 4 or 5 miles off, in 4½ fathoms; the river well open, and the N.W. head bearing N.E. Here the bottom is of heavy mud and clay.

On the eastern side of the entrance may be seen an assemblage of huts, called *Salt Town*, which is nearly 3 miles from the N.W. head. The Bar between stretches out to seaward, as already noticed. On the N.W. side of the entrance, a sandy spot extends from shore to the S.W., a part of which is dry at low water; and it is the more dangerous, as the sea commonly sets in with great impetuosity, the waves rolling in succession and with frequent breaks, especially with a fresh wind.[*]

In entering, you may stand toward Salt Town within a league, until the N.W. head bears N.E. by N. [*nearly N. by E.*]; then steer N.E. by E. about 2 leagues, toward the port shore, as you then avoid the Lobou Bank, which lies on the opposite side, and which reaches more than half way over. Having advanced as above described, you will see a bluff point on the starboard side, covered with trees, and which is called *Jo Point*. By steering for the middle of the river, off this point, you may there drop anchor in 4 fathoms, having a creek with an islet at the mouth to the northward. This creek is called *Waccow Creek*, and comes down from *Waccow Town*,[†] which is 5 miles up, from Benin River. The anchorage here is best for vessels intending to stay any time in the river, being open to the sea breezes, with a free draught through the roads, and in a central situation for trading purposes. This place, during the fine months, is very healthy.

Dr. W. F. Daniell says, "The shore from Fish Town to Jacqua or Waccoa Creek is composed chiefly of alluvial deposits, covered by dwarf mangroves, that project so far into the stream as to conceal its banks; and this is the common appearance throughout the river, except in those localities inhabited by the natives. At the aperture of the above creek two English factories are erected, in each of which a few white artificers and Kroumen reside, under the superintendence of a head factor. These edifices are commodiously built of wood, somewhat after the Spanish style, and contain a number of apartments on a middle story, elevated above the adjoining swamps."

Within Jo Point is a creek called Calabar Creek. At 5 miles higher, on the opposite side, is another inlet, called Lago Creek, having an islet on each side of its entrance, surrounded by a mud bank. The latter will be avoided by keeping over to the starboard shore until you are off the large opening called Gato Creek, where you may anchor abreast of the town of Regio, on the North, and New Town, on the South, in 3½ and 4 fathoms, near the *Warree branch* of the Benin, noticed hereafter.

Of the River Benin, Captain Matthews says, the Bar extends nearly 2 leagues off,[‡] that he never found on it more than 13 feet of water. nor less than 8 feet, at spring tides. "In the rainy season the sea runs very high, and breaks quite across. When going over it, I always had the dead lights lashed in, and an anchor hung over the stern, to let go occasionally, and to prevent the ship coming broadside to the sea, in case you should be so near the ground as to lose the use of her rudder; but I never was under the necessity of making use of it, always getting in and out without touching the ground; although, at times, I had very little water to spare.*

[†] The country of Jaboo carries on a constant trade to Benin, &c., though the medium of connecting creeks; and its cloths, which are greatly esteemed, are much in demand to the southward. Some of the best are equal to those of Manchester; but they are made in only two or three-inch widths.

[*] In the year 1788, Captain Landolphe founded a French establishment for a company called the Compagnie d'Owhyere. It consisted of a fort and a factory. It stood on the left bank of the river, near its mouth. It was very flourishing till 1792, when the war, consequent upon the French Revolution, caused its destruction. It was called *Borodo*, and was near Ouboby. Its position has been determined by Mr. Becroft.

[†] "Jacqua, or Waccas, is the largest town in the kingdom of Warree. It is erected on the right bank of a narrow tortuous stream, in a low and impenetrable morass 2 miles from the river. The population amounts to near 2,000."—*Dr. W. F. Daniell*, Medical Topography, &c., p. 43.

[‡] But at this distance there appears to be 4½ fathoms.

The best season for traders to the Benin River is between the month of September and the latter end of February, during which period there are clear refreshing breezes with fine weather, and land winds favourable for going out; but beyond the month of February, as the weather changes, getting out is attended with difficulty and danger.

It is high water, at full and change, at $4^h 30^m$; rise 7 feet. Variation, 20° 0′ W., 1846. The Old Pilot has noted that it flows in three hours, but ebbs in nine. The The rapidity of the tide, in the rainy season, very often carries away marshy fields, of some acres extent. You must be careful to steer the ship clear of them; otherwise, should they come athwart her, they will give you a deal of trouble.

In April, 1840, Mr. Becroft, in command of the *Ethiope* steamer, manned by fifteen Europeans, and a full complement of Kroumen, ascended the *Benin* or *Formosa*, with the intention of penetrating, if possible, to the upper course of the Niger or Quorra, by this means avoid the pestiferous swamps of which the lower part of the delta of this river is composed.

For about 40 miles from the sea, including windings, he found the Formosa Fermosa a fine bold river, with from 6 to 3 fathoms of water. At this point a bifurcation took place; both branches proving to be highly tortuous, and much narrower than the main branches of the river, but having a depth of not less than 3 fathoms so far as the steamer was able to ascend them. This Mr. Becroft computed to be from 40 to 50 miles on the one, and from 60 to 70 miles on the other, including windings, His further progress was obstructed at these respective points; not from want of water, for that continued as deep as before; but from the impenetrable forests of large aquatic plants, which choked up the streams in both branches, so as to render a further passage impracticable, except by cutting a way through them, which could only have been accomplished by considerable labour, and with great loss of time. Having satisfied himself that the Fermoso is *not* a branch of the Niger, but, probably, rising in the high lands to the N.W. of that river, he returned to the mouth,

He afterwards entered what may be called the Warree branch of the river. This branch they entered by passing through a creek of some magnitude, called *New Town Creek,* mentioned above, flowing out of the Benin to the southward. They succeeded in reaching the Niger at the point of bifurcation with the Nun Branch, a short distance below the town of Eboe, in lat. 5° 27′ N.

In their progress thither, they passed three openings or passages to the sea, which they presumed to be the Rivers *Escravos*, *Forçados*. and *Ramos*, as laid down in the charts. This navigation occupied a fortnight, during which time sickness appeared among the Europeans, of which five ultimately died.†

From Benin River to the southernmost land of Formosa, the coast of Warree extends south-eastward 39 leagues; and within this space it is broken by several rivers, as the *Escravos* or *Escardos*, *Warree* or *Forçados*, *Ramos*, *Dodo*, *Sengana*, &c, The coast is altogether a low, swampy, and unhealthy country, with a sandy shore, thinly inhabited, and, of course, but little frequented.

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* The first Englishman who entered and went up this river was Thomas Windham, in 1553, in company with Antonio Anes Pinteado, a native of Porto, in Portugal, appointed chief of the expedition. They traded there for Malagette pepper.

† "Journal of the Royal Geographical Society," Vol. xi., 1841, pp. 184—190.

The first river, southward of Benin River, is the RIVER ESCLAVOS, or Slaves River, known also in native parlance by the name of *El Broder*, or *Brodero*. Its entrance is 14 miles S. by E. ¼ E. [*S.E. by S.*] from Benin River. There are only 12 feet of water (and perhaps less) at the entrance; and off its South point the bank stretches a good way into the sea. Adjoining its entrance is a small town erected on the margin of a sandy beach, and which is encompassed and partially hid from view by a profusion of palm and cocoanut trees.—(*Dr. Daniell.*) This river communicates with that of Warree.

The RIO DOS FORCADOS (Galley Slaves River), or RIVER WARREE, or OWERREE, is 5 leagues to the southward of the Esclavos. The coast between winds round to the eastward. The entrance is in lat. 5° 21'. It is wide, with an island in the centre. Dr. Daniell says:—"Both this and the Esclavos, from their shallow estuaries, are seldom or never frequented, unless it be by slave ships, although, in the seventeenth and eighteenth centuries, the Portuguese and Dutch carried on a lucrative commerce with them, especially the latter. At the distance of 3 miles from the entrance is the island and town of *Paloma*, the latter consisting of from twenty to thirty dilapidated houses, situated on the left bank of the stream. The inhabitants transmit what little palm oil they produce to Jackree; the majority of them are now fishermen, and chiefly occupied in the curing of fish. Formerly the Portuguese had a fort, chapel, and three or four factories in this town; but they were soon abandoned, on account of the extreme insalubrity of the climate. Jerome Merolla da Sorrento, in his *Voyage to the Congo*, informs us that two Capuchin missionaries, named B. di Firenza and A. Aiaccio, sailed from the island of St. Thomas in 1683, to visit the metropolitan town of Warree, which by this route is about 16 miles to the N.E. of Paloma. They were the first persons that attempted to introduce Christianity into equatorial Africa, and it has been stated, converted many of the natives to its doctrines. Captain Adams states, that when he visited the town of Warree, he observed the several emblems of the Catholic religion, within the edifice in which these missionaries were wont to perform their religious ceremonies, still existed, and that 'a large wooden cross, which had withstood the tooth of time, was remaining in a very perfect state in one of the angles formed by two roads intersecting each other.' Vestiges of the building and ancient reliques may still be seen; but the cross, when I visited the spot, had wholly disappeared."*

Without the river there is anchorage in 7 fathoms, muddy ground. In the entrance are only two fathoms, and care must be taken to avoid a flat which extends from the S.E. side.

The RIO RAMOS (or Bough River) is 17 miles S. ¼ W. [*S. by E. ¼ E.*] from the River Warree. Its mouth is in lat. 5° 5¼'. The entrance is not quite a quarter of a mile in breadth, and, having no island in the vicinity, it may be easily distinguished from the former river.

The RIO DODO is 20 miles S. ¼ W. [*S. by E. ¼ E.*] from the Rio Ramos. It is small and little known. The natives of the coast are said to be ferocious; and are, therefore, to be avoided. The shore continues low and woody.

From the Dodo to a point commonly, but very improperly, called Cape Formosa, the distance is 20 miles. The coast between rounds more to the eastward than the coast to the northward, or S. by E. ¼ E. [*S.E. ¾ S.*] This point lies in 4° 31' N. and 5° 41' E. The land hereabout is so low, that the trees upon it seem to stand in the sea; you, therefore, have them in sight before you descry the land. From 15 fathoms neither trees nor land can be seen. At 6 or 7 miles from shore, the depth is 5 and 6 fathoms. Between the Rivers Dodo and Sengana, there are the branches named in the Admiralty survey, *Pennington* and *Middleton Rivers*, and the *Winstanley Outfalls*.

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* Sketches of the Medical Topography, &c., of the Gulf of Guinea, by W. F. Daniell, M.D., F.R.G.S., F.E.S., pp. 63, 64.

Current.—In the months of July and August there is always hereabout a strong easterly current; so that it is proper, when you sail along the coast, to keep off at a considerable and safe distance; not approaching nearer than in 8 fathoms, which is 2 or 3 leagues from land. The bottom is commonly so deep in mud, that the lead immersed in it is raised with difficulty.

South-eastward, about 10 miles from the point above mentioned (in lat. 40° 31′), is a small river, called the Sengana, or Sengma. On the North bank of this river is a small town, enveloped in trees. On advancing, with the creek open, it shows with low land on the western, and a steep bluff on the eastern side. The coast thence to the *River Nun or Quorra* is bluff and level. The distance between is about 3 leagues. The Bar of the Nun, otherwise Quorra, according to the late survey, is in lat. 4° 16′ N., and long. 5° 56′ E.

"The River Sengana is the southern extremity of the Bight of Benin, and the obvious projection of the land in its vicinity may therefore be termed with more propriety Cape Formosa. This Bight, comprising a tract of coast of nearly 360 miles in extent, and excluding some parts of the slave coast, may be merely considered as one vast and almost interminable forest swamp, whose continuity is broken by the petty rivers and creeks that meander in all directions through it. It is, without exception, the most deadly portion of the West Coast of Africa."—*Dr. W. F. Daniell.*

THE RIVER NIGER, NUN, OR KWARA.

We have already shown in the note, page 491, the commencement of the Expedition of Messrs. Richard and John Lander; and have now to add, that, under various perils and disadvantages, the Landers proceeded through the country, to the north-eastward, until they reached *Yaooris* or *Youri*, near the eastern bank of the Kwara in the latitude of 11° 10′ N., or thereabout, and thence descended to the sea, by the stream ultimately found to be that called the *River Nun*, eastward of Terra Formosa, which they reached in January, 1831.

This important discovery produced the Expedition into the interior by the steam-vessels *Kuorra* and *Alburka*, in 1832, 33, and 34, of which a Narrative was drawn up and published by Messrs. Laird and Oldfield, surviving officers of the expedition.* These interesting volumes show how far it may be practicable to open a direct commercial intercourse with Central Africa by the navigation of the river. "It is quite true," says an intelligent writer, "that the bold attempt failed; but the circumstances under which it was made deserve to be taken into account, before the experiment be utterly abandoned as unattainable. The chief difficulty with which the travellers had to contend was the climate, which produced excessive mortality among the crews. Against this no human skill can provide; but the authors prove that there is nothing else to prevent a communication with Central Africa by this route, though the contrary has been affirmed. Mr. Laird, in alluding to the experiment, says distinctly, 'It has proved that any man, with common sense and common ability, may ascend and descend the main artery of Africa (provided he escapes the effects of the climate) with perfect safety, in moderate-sized vessels, from the sea to Boussa.' (Between 10° and 11° N.) The expedition, in so far, cannot be said to have proved altogether useless.

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* Two steamers were constructed for the expedition; one, named the *Quorra*, was 132 feet in length; the other, only 70 feet long, was entirely composed of wrought iron, and called the *Alburka*, or *Blessing*; these were accompanied by the *Columbine*, a fine brig of 200 tons, and left the port of Liverpool on the 19th of July, 1832. The crew were all picked men, from 25 to 35 years of age; which, in a few months after, were reduced to four only! We are happy in saying that the life of Capt. Wm. Allen, R.N., who surveyed the river, was preserved for usefulness in other parts of the world.

"It is clear that a wide field is here open to the labours of the philanthropist; for that the people still remain in the lowest depths of mental darkness appears indisputable."

Boussa, or *Boossá*, is the place where, thirty years before, the adventurous Mungo Park unhappily perished.

Three months after leaving Liverpool, the expedition arrived at the mouth of the River Nun. The bar was crossed with some difficulty: but what threw the most inauspicious gloom over this stage of the enterprise was the death of the captain of the *Kwara*, and one of the engineers, so soon as the vessel was within the river. Nevertheless the steamers proceeded to ascend the stream, the *Columbine* being anchored to await their return, within reach of the sea breezes. For a distance of 30 miles up the river there was no land, not even mud, visible; the mangrove trees alone marking the channel. The inhabitants of this swampy country had a most miserable appearance, being covered with ulcers, Guinea worms, and cutaneous eruptions. The river, as it was ascended, grew wider, the banks were higher, and thick woods of stately trees succeeded to mangrove thickets. *Eboe*, at 140 miles (nautic) up the river, lat. 5° 40′, was the first town of any importance reached by the voyagers. This town stands by the side of a creek running nearly parallel with the Kwara, and in the flooded season communicating with it at both ends. On a rough estimate the town consists of 800 to 1,000 houses; and allowing on an average six people to a house, will give the amount of population, two-thirds at least of which may be considered as under fourteen years of age. The inhabitants are the most enterprising and industrious traders on the Kwara. The town itself, with its immediate vicinity, is unhealthy, owing to the swampy nature of the ground; few old people of either sex were seen, and a great number of young men appeared debilitated and aged.

The staple trade of Eboe consists of slaves and palm oil. The value of the former varies, according to the demand on the coast; but the average value of a lad of sixteen may be taken at 60s., and that of a woman at something more.

Palm oil is produced in immense quantities about Eboe, and is collected in small gourds, each capable of containing from two to four gallons, from which it is emptied into trade puncheons. Some of these, belonging to vessels in the Bonny, were seen in canoes at Eboe; but generally the gourds are taken in large canoes to a market place on the Bonny branch of the Kwara; which branch being dry in the dry season, the Eboe oil then finds its way through the *Brass Creek* eastward to the Bonny.

Abundant as palm oil is at present at Aboe, it might be easily obtained, according to Mr. Laird, in much greater quantities. He calculated that not above a twentieth of the natural produce is collected. But so long as the slave trade exists, it is in vain to look for the development of the industry and commerce of these countries.

At a little distance above Eboe, large branches issue from the river to Benin and Bonny; and higher up the Kwara is a noble stream, 1½ mile wide. The scenery continually improved, and presented an exhilarating variety to our voyagers, heartily tired of the monotony of the river to the southward. But the fatal taint of disease was on board, and the affliction had already become too serious to admit of alleviation from cheerfulness of scene. Fifteen out of thirty-seven men died within a few days, and nearly all were indisposed; but the sight of the mountains which stretched across the river a little higher up gave hopes of a better climate, and helped to prevent the men from yielding to feelings of despair. They had now reached the town of *Idda*, or *Attah*, lat. about 7° 6′ N., long. 6° 45′ E., which is seated on a hill, overhanging the river in some places with cliffs 150 feet in height. Of this place, Mr. Laird observes:—

> It is healthy, and the only place we have yet seen in the river where a European could possibly exist for any length of time. It has many natural advantages, and on some future day will be a place of great importance. Situated as it is, above the alluvial soil, and at the entrance to the valley of the Kwara, it commands at present the whole trade of the interior; which trade, although trifling at present, it requires no prophet to foresee will, at some time hereafter, be immense.

Above Attah, otherwise Idda, the river forces its way through the chain of mountains. These mountains have all flat summits, of equal height, apparently from 2,500 to 3,000 feet above the river. At the entrance to this beautiful part of the river is the town of *Bocqua*, where a fair is held on a sandbank every ten days, to which some thousands of people resort, many of them coming distances of 200 or 300 miles. This fair is of three days' duration; it is attended by Eboe and Attah, and even Bonny traders from the South, as well as those from many towns of the N.E., North, and N.W.

"The river abounds in fish to a degree that is almost inconceivable, and the inhabitants of the banks are expert and persevering fishermen. They make vast nets of grass, which they use as seines with great dexterity. They are very careful of their nets after using them, and stretch them on poles to be dried by the sun, exactly as our fishermen do. The fish are split and gutted; they are then dried by the smoke of a wood fire, and form, with farinaceous food, the principal means of subsistence. Fruits are not plentiful on the banks of the river; plaintains, bananas, limes, tamarinds, a species of plum, and pine-apples, constitute the whole. The latter are exceedingly scarce, and the former by no means abundant.

"The intercourse and trade between the towns on the banks is very great, the whole population being eminently of a commercial character; men, women, and children, carrying on trade. The traffic in slaves, cloth, and ivory, is confined to the men; everything else being left to the other sex, who, to say the truth, are far the most difficult to deal with."

The confluence of the two great rivers, the *Kwara*, *Quorro*, or *Kowara*, and the *Binué*, *Tchadda*, or *Shary*, is in lat. 7° 47′ N., long. 6° 43′ E., as shown by Dr. Baikie. The country above, which is beautiful in appearance, is very thickly peopled. The highest point reached by the *Alburka* was *Rabba*,[*] below lat. 9° 14′ N., a town containing 40,000 inhabitants, situate in the centre of a populous country, and visited by Arabs from Tripoli, by merchants from Timbuctoo, from Bornou, Howssa, and those from the countries down the river, who trade with the European settlements on the coast.

The discovery of the outlet of the Niger by Lander, gave an impetus to enterprise in that direction, and the above expedition was one of the results of that discovery.

The *Ethiope* steamboat was afterwards fitted out by Mr. Jamieson, and despatched under the command of Mr. Becroft, who successfully navigated the river, as before mentioned.

The British Government, deeming it advisable that the African trade in this quarter should be placed on a firm basis, and also prove a means of ameliorating the condition of the native population, an expedition was fitted out, consisting of three steam-vessels—the *Albert*, *Wilberforce*, and *Soudan*—fine ships, built expressly for the purpose. The expedition was put under the command of Captain H. D. Trotter, in the *Albert;* Commander William Allen, the surveyor of the river, in the *Wilberforce;* and Commander Bird Allen, in the *Soudan.* The vessels left England in April, 1841, and the disastrous results of their voyage are still fresh in the memory of our readers. They found the lower part of the river under the authority of King Boy of Brass Town, which extended as far as Eboe, to which point the vessels reached without troubles. But here they began, disease attacked the crews, and they struggled on to Iddah, by the 10th September, when the *Soudan* returned with the sick. The *Wilberforce* soon followed, and the *Albert* alone ascended some 36 miles above the confluence of the Tchadda. They established the model farm, but beyond this little could be done, and the sad remnant of the expedition was rescued by the exertions of the excellent Captain Becroft. Such was the result of this fine expedition. In 1842, Lieutenant Webb ascended the Kwara to examine the model farm, which he evacuated, and thus concluded all that had been accomplished.

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[*] Subsequently (in September, 1840), Mr. Becroft, in the *Ethiope* steamer, ascended to within two hours of *Lever*, in lat. 9° 43 N., when the current was found to be too powerful to make head against.

The most complete account of the Kwara is that given in Dr. Baikie's work, "Narrative of an Exploring Voyage," 1856. Dr. Baikie went out with a small iron screw schooner, the *Pleiad,* in May, 1854, and was to take Mr. Becroft, H.M. Consul at Fernando Po, as chief for exploring the Binue or Tsadda. But Mr. Becroft had died before his arrival, and Dr. Baikie undertook the examination. How he lived in the upper portions of this important river, and died just after leaving it on account of the climate, is fresh in the memory.

The river was surveyed by Captain Allen, but this has been re-examined by Captain J. W. Glover in 1857—9.

It is high water on the bar of the Niger at $4^h\ 8^m$; the rise is 6 feet. The mark for crossing the bar, in 15 feet water, is the mark tree, a large one, on Point Trotter, on the East bank within the entrance, in one with Palm Point, the S.E. entrance point bearing N.N.E.

VI.—THE BIGHT OF BIAFRA, FROM THE RIVER NUN OR KWARA, TO CAPE LOPEZ, INCLUDING THE ISLANDS OF FERNANDO PO, PRINCES, ST. THOMAS, AND ANNO BOM.

The navigation * of the BIGHT OF BIAFRA † will, at all times, be found very tedious, owing to adverse winds and currents, and light eddies of wind and calms, caused by the great height of the islands lying in the direction of the winds which usually prevail. The East coast of the Bight is, in one respect, rather deceitful. Near the sea the coast is of no great height, but has high hills or mountains at a distance inland; and these hills in hazy weather are liable to be taken for the sea coast itself, and thus the stranger may probably find himself aground, when he thinks he is 12 or 15 miles, or perhaps more, from the land.

I am sorry I cannot give any advice as to the smallest depth of water into which a vessel on this coast may stand with safety. My own practice is (in the night) not to go into less than 10 fathoms, between Bimbia and Point Suellaba; thence to the River Borea not less than 12 fathoms; thence to the Bight of Pannavia, 18 fathoms; and thence, nearly to Cape St. John, not less than 26 or 28 fathoms. Near Cape St. John, caution is required, as the cape itself is bold, and the current often runs with considerable force directly upon it. From Corisco to the River Gabon, a vessel may tack in the night in 18 or 20 fathoms.

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* The following remarks on the navigation and directions for the Bight of Biafra, are by Captain Midgley, 1841.

† The term Biafra or Biaffra appears to be a corruption of *Maffras,* as the Portuguese discoverer named one of the Rivers of the Bight *Rio de Maffras.*—Sir J. J. Lopes de Lima, "Ensaio," &c., livro II., part I., p. viii.

In the vicinity of the land the starboard tack requires a very careful look-out, owing to the general easterly tendency of the currents.

After passing considerably to the southward of Rolas Island, I have generally found it difficult to keep to the southward of the Equator, in all seasons, owing to prevalent S.W. winds and northerly currents; and I have never found any easting in the wind until after I had passed the meridian of 4° West, and generally not until the vessel had attained the longitude of 5° or 6° West between the Equator and 2° to 2½° of South latitude.

Between the second degree of North latitude and the African shore, the currents almost invariably (except in the Harmattan season) run with velocity to the eastward, particularly between April and September; and a vessel bound to the windward coast in these months should *never* go to the northward of the above parallel, until she has attained the meridian of the place bound to; if a little to the westward of it, all the better; and should then make allowance for an easterly current of full 1½ mile per hour.

Between April and September, it is probable that homeward-bound vessels may make a good run, by steering to the northward, when they have reached the meridian of 10° W., and thence shape a course towards St. Jago, guided, of course, by wind, weather, and current; but it is probable, in these months, the wind in this track will hang from S.W. and W.S.W., with squalls and rain.

Notwithstanding a number of fair passages have been made in the above tracks, on mature consideration, I am still inclined to recommend the route to the southward of the Equator, as far as 20° West, as the most preferable, because the most certain; and it is surely better to sail with a fair wind, a favourable current, and fine weather, than to be annoyed with continued squalls and rain—to say nothing of the probability of adverse winds and calms—in a region proverbial for the diversity of weather.

It may be well to state, that these remarks on African navigation are more particularly intended to apply to heavy, deeply-laden, and consequently dull sailing vessels; for in the African oil trade, capacity for carrying a very large cargo, at an easy draught of water, is considered to surpass every other quality a vessel may possess. Superiority of sailing is scarcely ever regarded as even of second-rate importance.

The PREVALENT WINDS which blow upon this coast from S.S.W., W.S.W., and West, nearly throughout the year, and during the wet season, with much force, must have great influence on the current; which I have found from actual experiment prevails in 12 fathoms water, with some strength; and from my own experience, when at anchor on the coast, I think this depth of water may be considered as the general southern boundary of the influence of the tides, which, in 8 fathoms water, appear to set in a S.E. and N.W. direction, or nearly so,—the flood running towards the north-west. Off Bonny, in 6 fathoms, at low water, I have several times in the wet season (when the ship was at anchor) found the ebb tide setting South-east, and running more than 3½ miles an hour; when heavy freshes come down the river, in consequence of the interior of the country being overflowed by the heavy rains.

The CURRENT along the coast between Formosa and Bonny runs generally to the eastward, at the rate of 1 to 2 miles, and in the wet season frequently nearly 2½ miles per hour; but it sometimes, though rarely, runs to the westward with great force. Several vessels from Fernando Po to Bonny (of course unprovided with chronometers) have found themselves off Cape Formosa; and I have known instances of vessels being set still further to the westward. Should a vessel from Cape Badgley, or George's Bay, Fernando Po, and bound to Bonny, or New Calabar, have run 120 miles upon a N.W. by W. course, without seeing the land, or be in more than 15 fathoms water, it will in most cases be prudent to bear up N. by E. or N.N.E., and she will most likely make the land to windward of Bonny.

ANCHORAGE.—A few remarks on the anchorage off this coast may not be altogether irrelevant; and without presuming to advise those already experienced in the trade, the following remarks and suggestions may be of service to the stranger.

Many windlasses have been capsized and broken, and anchors and cables have been lost, owing to vessels very improperly anchoring in shallow water, or too near to the bars of the rivers, for in such situations the sea runs very high in the wet seasons, and it is indispensable to have sail well set upon the vessel previous to tripping the anchor, or heaving in too much cable; and the action of the wind upon the canvass very materially contributes to the violent jerking motion of the vessel, when at anchor in a seaway.

Vessels should never anchor during the wet season in less than 6 fathoms at low water, calculating 7 feet at the full and change, for the rise and fall of tide in that depth of water; and should ride with a large scope of cable, if there is any sea, so as to have as little strain as possible upon the anchor—the elasticity of a large scope of cable will make the vessel ride much easier in a moderate depth of water.

Strangers to the navigation will find that the heavy short sea which sets in upon this coast, between the months of April and October inclusive, combined with the tenacious quality of the ground for holding, will require more than usual precaution, to prevent the loss of anchors and cables, and perhaps of windlass, bitts, and deck bolts: for off Bonny, and indeed all along this coast, the best of ground tackling, and a good and well-secured windlass, are pre-eminently necessary, as damages cannot be well repaired in the Oil Rivers.

Every vessel bound to this coast should be provided with a spare set of windlass pawls, previously well fitted in England; as these indispensable articles are frequently broken, and cannot be replaced in Africa.

These remarks may perhaps appear trifling or superfluous, but Bonny Bar has long been notorious for the number of anchors and cables lost in its vicinity; and in the wet seasons, few vessels which have anchored outside, come into Bonny, without more or less danger to their ground tackling.

The following remarks by Capt. Boteler, on the coast between the Isles de Los and Sierra Leone, are so precisely applicable to this coast also, that I shall take the liberty of introducing them here, as an excellent warning to the mariner; only premising, that for this coast the months of April and October should be substituted for those of "December and April." Capt. Boteler says (I quote the "Memoir of the North Atlantic Ocean," 8th edition, p. 101), "The surf on this coast is extremely heavy; the rollers sometimes curling in 5 fathoms, and breaking tremendously in 3, or even in 4. They may be, in general, expected between December and April, and chiefly about the times of new moon; and therefore, during this interval, vessels should avoid anchoring in shallow water in unsheltered places, especially in the vicinity of a large river, as the opposite tide tends much to increase the danger."

I do not mean to assert that the above is at *all times* applicable to the coast about Bonny; but it is occasionally so, in its fullest extent, about the full and change of the moon, in the wet season, or between April and October.

I have *several times* lost anchors and part of cables by these rollers, when lying in 6 fathoms water, outside of Bonny Bar; and upon two occasions, in strong S.W. gales, with a very heavy sea and flood tide, was obliged to run for the river, when the breakers were running directly across the Bar, and the channel could not possibly be distinguished, except by the marks on the land; very fortunately, the brig happened to be light; but these circumstances have forcibly impressed upon my mind the danger of anchoring too near the Bar.

DIRECTIONS.—In beating up from Fernando Po to Bonny, with a dull sailing vessel, between the months of March and November, it is generally advisable to work to windward along the western shore of the island, as far as "George's Bay," or even to "Cape Badgley;" for the current almost invariably runs much stronger to leeward along the North shore, and in its vicinity (which is one continued bank of soundings), than it does further to the southward.

On reaching off from the vicinity of George's Bay, with winds from the S.W. quarter, vessels generally make the land about Andoney River, after running upon a N.W. by W. course. On making the northern land, if it lies E. by S. and W. by N., *and no river is seen* still ply to windward. Should the land trend to the northward, the vessel will be to the westward of the land of Formosa.

If any river is seen with a narrow entrance, or even 2 or 3 miles wide, it cannot be Bonny, the entrance of which is 7 miles in width, from Foché Point to Rough Corner.

At 10 miles off the entrance of Bonny River the ground is pretty hard, and the depth of water about 6 fathoms; but at the same distance off the mouths of any of the other rivers the ground is soft, in many places pure mud, or mud and oaze, and the depth of water at 10 miles from the land will be about 10 fathoms. The shoalness of the water and distance from the land, together with the bottom being harder than any other place in the vicinity, is alone sufficient to indicate the proximity of the entrance to the River Bonny.

If, on making the land or working to windward, a river should be seen open, go to the mast-head, and diligently examine the land to the *westward;* if there is any appearance of any other river within the distance of 9 or 10 miles, and if the *western* point of such second river can be made out or seen, *and at the same time* the vessel is in 10 fathoms water, with muddy bottom, at 10 miles from the land, you may rely upon being to the westward of Bonny; for in 10 fathoms water off the Andoney, the western point of Bonny River cannot be seen from the deck, and only very indistinctly from the mast-head in perfectly clear weather; and even then it will look like detached trees growing out of the water, unless the refraction, as is often the case, be very great. In 6 or 7 fathoms water, off Andoney, Rough Corner appears like a low, level, and tolerably bluff point; and when the River Andoney bears N.N.E., or even N.E., no land can be seen from the deck, to the westward of Rough Corner; but when Andoney River bears N.E., in 6 fathoms water, the breakers on the Baleur Sand may be seen from the foreyard, between half ebb and one-third flood, particularly if there is any wind.

Should *any* of the other rivers between the land of Formosa and the Andoney (except the Andoney itself), be made upon a bearing from N. to N.E., *both* the headlands which form a second river will be distinctly seen from the deck, if the weather be tolerably clear, and the vessel is in 10 fathoms or less water; and when two rivers can be made out from the deck,—one open, and *both* the headlands which form the other seen,—it affords another proof that the ship is to the westward of Bonny.

Should a vessel make Bonny River bearing from N.E. to North, it will be readily known from its superior width at the entrance, the shallow water, and harder bottom than any other part of the coast; the River Sombreiro will also be seen open. (The Bonny and Sombreiro are the only two rivers on this coast which can be seen *well open from the offing* at one view.) The Sombreiro may be readily distinguished from its bluff head on the West side. When fully open it bears N.W.; and at two-thirds of the distance from it, towards Foché Point, there is a remarkable gap or indent in the land. When this gap bears N.N.E., the eastern point of Bonny River cannot be seen from the deck. The breakers on the Baleur is also a sure mark for the Bonny. The Bonny and New Calabar Rivers cannot be seen fairly open at one view, until a vessel is very nearly upon the outer Bar of Bonny River.

Be careful of estimating distances in this neighbourhood from the eye; the lead is the only unerring guide, and should be constantly used, *except* between the Sombreiro and Andoney; and about three-quarters of a mile may be allowed in practice for every fathom of water; that is, 10 fathoms may be considered as 7½ miles from the land, though (in reality) it is fully 9 or 10 miles off, and so in proportion; but within the limits above named between the Sombreiro and Andoney, the New Calabar, Bonny, and Andoney Flats, and the Baleur Sand, run a very long way to the southward; and the land in this neighbourhood should not be approached within 4 leagues, nor be more than barely seen from the deck, unless bound to Bonny River, and should always be approached with caution, as the tides have more influence in the offing than is generally supposed. At the above distance from Rough Corner the depth will be about 6½ fathoms at half-ebb.

Bear in mind, that along the whole line of coast, from Cape Formosa to Andoney, the water shoals very rapidly in-shore of 5 fathoms, which depth is the general outer boundary of *muddy water*. and not far from the banks which form the bars of the various rivers.

As a general rule, no ship should go into less than 6 fathoms water. If intending to anchor, there is much less sea and better ground all along the coast, in 10 fathoms water, than further in-shore. Inside of 7 fathoms there is a short heavy swell, and sometimes in the wet season high rollers, which cause a vessel to ride very uneasy. By anchoring in this depth of water, a vessel will have a good drift before she can go into danger, should any accident happen to her anchors or cables.

All along this coast. and especially in the vicinity of Bonny, constant and careful attention to the land will be found indispensable. The lead lines should be constantly and carefully examined, or the ship may be placed in a dangerous predicament. Neglecting this has been the cause of more than one vessel striking upon the Bar of Bonny.* If bound to Bonny, it may not be prudent in the wet season to run to leeward of the Fourth River after sunset, or the strength of the current may set the vessel to leeward.

DESCRIPTION OF THE COAST.

The NIGER to NEW CALABAR RIVER.—The Niger, more properly the Kwora, is the first of six rivers which intersect the coast between the land of Formosa and New Calabar River—an extent of 20 leagues. It was first called *Rio Nun* by the Portuguese, who gave the name of *Cape Nun* to the West Point, and *Cape Filana* to the East. Off the river the water is shoal and muddy, out to the depth of 7 fathoms, which is 3 leagues from the entrance. This is the only one of the Six Rivers that is accessible; but even here is a bar of 2 fathoms, on which the sea breaks with great violence. The whole of these rivers are outlets of the *Niger*, or *Quorra*, and form the delta of that river.*

The Rio Bento, or *St. John*, *Second Brass River*, *Malfonsa*, or *Oddy*, the Second River, is 11 miles to the eastward of the Rio Nun. It opens, when bearing N.E., with a high bluff on each side, the eastern one being remarkable by several round spreading trees. When this river bears N. by W. there is the appearance of an island, with several trees on it.

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* It would be a desideratum if some soft and pliant substance could be invented for hand-lead lines, which would not be liable to expand and contract from the action of the water. I have frequently had to correct the marks upon lead lines, after an hour's use, as well as when they have become dry. Lead lines require frequent examination; and I have found that, if the lines are soaked in a tub of clean salt water for two or three hours, and then corrected previous to using them, the lines are not so liable to shrink.—*T. Midgley*.

† These rivers, their towns and people, their cannibalism and customs, are described by Mr. Consul Hutchinson in his work, "Impressions of Western Africa," 1858, chapter vii, and in his Ten years' wanderings among the Ethiopians, pp. 45, 63, &c.

Capt. W. Tucker gives the following directions for the St. John:—In going into this river in a boat, I would bring the West point of the river to bear N.N.E., per compass, about 1½ mile off-shore; then steer N.E. by compass, or N.E. by E., or bring the East point of the river to bear N.E. by E., and continue so until you open the river clear; when I would steer the direct course of the river, about North by compass, making due allowance for the tide, which on or near the bar, with the ebb, sets out S.S.E.; the flood in the opposite direction varying slightly in its bearing as the force of the tide alters.

Mr. Roberts adds:—When going in there is generally so much swell, it is probable the compass will vibrate too much. In that case pull in, keeping the East point of the river a little open on the port bow, until you get sufficiently near to see the river quite open; then steer in the direction of the river, attending to the set of the tide, whether ebb or flood. It is advisable that boats should go in at last of flood, at high water, or first of ebb, but at no other time during the spring tides. During neaps vessels cannot be brought out, except at the top of high water, and it is seldom attempted. In the entrance of the Nun there are two bars, to cross which the same precaution must be taken as on entering *St. John's*, or *Brass.*

According to Dr. Daniell, the Rio St. Bento, or St. John's River, is, from its insignificance, but rarely entered. By some it has been stated to have a greater depth of water, and to afford a more direct and easy route to the town of Brass than by the devious creeks of the former river. *Brass Town*, the seat of government of those regions, is located upon a flat and denuded patch of ground within the recesses of the forest swamps, and barely elevated above the water of the creek that flows past it. To Europeans its *locale* is almost unknown. It has a population of 3,000, who are mainly dependent on the Ebo plantations for the means of subsistence. From this stream to that of the New Calabar, a distance of 50 miles, the land is merely a low, desolate, and marshy jungle, heavily timbered with mangrove, and bounded on the verge of the sea by a beach of sand, the continuity of which is interrupted by the apertures of four inferior rivers. They have been denominated the Rio St. Nicolas, or Filana River, Sta. Barbara, or Sempta River, Meas, or St. Bartholomew, and the Rio dos Tres Irmaos, or Sombreiro. As these titles are decidedly of Portuguese nomenclature, it is probable that either Diego Cam, in his voyage along the coast from D'Elmina to the Congo, or Fernao do Poo, in his expedition to Benin, conferred such upon them.*

St. Nicolas, or *Filana*, or *Tilana*, or the Third River, is 11 miles to the eastward of the Rio Bento. The coast rounds between. The river does not open until bearing N.N.W. It has a tapering bluff on the East side, and low land seems to cross the river within, having some round-topped trees on it.

Santa Barbara, *Sempta*, or the Fourth River, is 11 miles E. ¼ S. [*E.N.E. ¾ E.*] from the Rio St. Nicolas. This river has a wide entrance; it appears with the West point low, and does not open until it bears N.N.E., then the easternmost bluff shows like a dolphin's head with the mouth open.

RIO S. BARTOLOMEO, *Meas*, or the Fifth River, is 7½ miles to the eastward of Rio Sta. Barbara. About its entrance the land is low; it is large, has two bluff heads, but highest on the East, runs in a direct line to the northward, up the country, and opens when bearing North. The shoal ground from the entrance extends to the distance of 4 miles, without which are 3 and 4 fathoms.

Rio Sombreiro, or *dos Tres Irmaos*, or the Sixth River, is 10½ miles E.S.E. ¼ E. [*East*] from Rio S. Bartolomeo. It opens, when bearing N. by W., and makes with a large tapering bluff on the West side.

Mr. Finlaison says that a vessel drawing 12 or 14 feet of water may proceed into Sombreiro River, it having a channel of one-quarter of a mile; the least water he found was 3 fathoms, in a N.E. by N. direction, the reef in a line bearing S.E.; the

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* Sketches of the Medical Topography, &c., pp. 77, 78.

West point of the river, N.W. 3 miles; Foché Point, East; this was in mid-channel, between the reefs.

All the Coast between the Six Rivers is thickly covered with mangrove, with a sandy beach, stiff clay and muddy bottom without, in 6 and 7 fathoms. The current is generally strong to the eastward.

NEW CALABAR RIVER.—Foché Point, the western point of New Calabar River, is 8 miles E.S.E. ¼ E. [*East*] from the Rio Sombreiro. Between is a bank of hard sand, extending from shore to the distance of nearly 2 leagues, and as far to the East as Foché Point, where it is bordered by a line of breakers. The western extremity occasionally breaks very violently, but may be passed in 5 or 6 fathoms. Foché Point is a steep bluff, in lat. 4° 22′ 40″, long. 7° 0′.

"The Rio Real, or New Calabar River, was designated by the Dutch traders as New Calabary, and by the English as the Calbarine. In the last century it was much frequented by small sloops, or shallops, that extensively traded for yams, manioc, and other farinaceous articles, then imperatively required by the larger slave ships of Bonny and other rivers to leeward. Besides vegetable and other exports, it yielded at periods no inconsiderable number of slaves from the Hackbous or Ebo country. The attention of the inhabitants is now directed to the culture of the palm tree, and the vending of its produce, with which they load annually several ships."—*Dr. Daniell*, "Medical Topography," p. 78.

The estuary of the New Calabar and Bonny Rivers is 8 miles in breadth; the town of Bonny, bearing E. ¾ S. [*E. by N.*], is 8¼ miles from Foché Point. The outer point, on the East, is called *Rough Corner*. There is a channel on each side into the respective rivers; but the middle part is occupied by a large bank, extending out to sea, and on several parts of which are only 3 feet of water, with one or two islets, and several spots nearly dry at low water.

The New Calabar pilots say that the old channel leading into that river is completely blocked up, and they now use a narrow swashway which the tide has formed through the western breakers, close to Breaker Island, which has only 12 or 13 feet at high water springs. Five or six years ago, says Captain Midgley, I turned to windward, through the old channel out of New Calabar, in a brig drawing 14¼ feet of water; another proof that the tides are making rapid alterations in the vicinity of Bonny.

Rough Corner, in the survey by Captain Vidal, is given as in lat. 4° 23′ 40″ N., long. 7° 7′ E. High water, on the full and change, at 5ʰ; rise, 9 feet. Variation, 20° 7′ W.

Foché Creek, or *Gap*, is 3 miles to the westward of the extremity of Foché Point; on the middle of the coast between are a few houses.

According to Dr. Daniell, "the village of Fouché, or Foko, orignally named by the Hollanders Wyndorp (from the abundance of palm wine, or Tumbo, procurable from its natives), consists of a number of scattered houses, indiscriminately erected around the point. It is inhabited by the river pilots and their families, who are mostly engaged in piscatory pursuits, in which they are very expert. The aggregate amount of the people is above 300. A deep and conspicuous indentation of the coast, 3 miles to the westward of the point, is called Fouché (or Foché) Gap. A few native huts may be strewed amid the evergreen brushwood that skirts its limits. Fouché village and point are decidedly the most healthy localities in New Calabar, from their favourable exposure to the daily sea breezes, and exemption from mud banks, with their natural concomitants, musquitoes and sand flies. The soil in the neighbourhood of the houses is a thin layer of sand upon a bed of alluvial deposits. The sandy shore in front of these habitations may be said to continue to the mouth of a narrow creek that obliquely winds behind the town towards the Gap, where it has been supposed to join the ocean. Six or seven miles beyond Fouché Point is *Youngtown*, scarce worth the name applied to it. It possesses about 800 inhabitants, the majority of whom are the slaves of a petty chief. Some tall and graceful cocoa-nut trees, with an occasional palm and banana, are the only objects that serve to dissipate the pervading monotony of mud and mangroves meeting the eye on all sides. A short distance from the creek is the entrance of another that leads to the Kwora, and through which the Bonny canoes pass when they attend the Ebo markets. The upper projection of the bank at its mouth is called *Juju Point.* Abreast of it the merchant vessels commonly anchor. Following a circuitous course for some miles to the N.W., it unites with one that passes by the chief town of New Calabar, 5 miles more to the North. This latter creek, after effecting a junction with that just mentioned, conjointly with it trends towards the Brass country, thus constituting an island, on the right bank of which, in proximity to the river, the metropolis of the kingdom is situated."—" Medical Topography," &c., p. 80.

Many of the streets of New Calabar reach down in parallel rows to the water's edge of the creek, which is barricaded on its whole extent of shore by the entrances into the streets by stout and lofty palisading.*

Mr. Finlaison directs those bound to the River Bonny, or New Calabar River, when running for Terra Formosa, to keep in the latitude of 4° 10′ N., and no further to the northward. If in the daytime, you may advance as near as you please in 5 fathoms. On running along shore, at low ebb, thick clay-coloured water will be found at the distance of 6 or 7 miles from shore, With high water it does not appear thus at more than 4 miles off.

If bound to the New Calabar, or Bonny, make Sombreiro, or the Sixth River, and you may be certain where you are, for it does not open until it bears N.N.W.

After leaving Sombreiro River, you will find that the shoal above mentioned will oblige you to haul off a point or two; but, with daylight, you will see Foché Point before you get that length.

From Foché Point upward the coast of New Calabar River trends nearly North; the East point of the entrance is a league above Foché Point and the middle bank, or Calabar Flat, it is little more than 1 mile. The depths above Foché Point decrease from 7 to 5, 3½, and 4 fathoms. At 3 miles, in middle channel, above the eastern point, are 5 fathoms.

A spit of sand, extending to the S.E. from Foché Point, forms the bar of this river. Its inner part dries, and without this are from 10 to 15 feet of water. In the channel without the bar, on the West side, are likewise several shoals. You may enter here, with Foché Point bearing N.E. ¾ N., and then giving these shoals a sufficient berth. The depths in mid-channel are 3 and 3½ fathoms at low water.

BONNY RIVER.—" The *Bonny*, or *Bani*," says Dr. Daniell, " was one of the first rivers which the Dutch, English, and Portuguese were acquainted with in this portion of Africa. From the sixteenth to the present century it was the favourite mart of the slave ships, when the exportation of human beings was a legalized traffic; and the amount of slaves transhipped seldom came to less than 16,000 per annum. Since the extinction of this odious commerce, it ranks as the grand emporium of the palm oil trade, exporting many thousand tons of this lucrative commodity, and employing more vessels than all the rivers of the Bight collectively."—" Medical Topography," pp. 82, 83.

The Bar of the Bonny River extends S. by E. from the great middle ground or flats; and its outer extremity is 7½ miles S.W. from Rough Corner. To the eastward of the Bar, separated by a channel 1 mile in breadth, is a bank of hard sand, named the *Baleur*, which has an extent of 4 miles S.E. and N.W. Beyond this, on the East, are two shoals, the *Middle and Eastern Patches.* The *Eastern Channel* into the river, called the *Portuguese Channel*, is between these banks and the Bonny Flats, which extend from shore; added to which, on the same side, is an outer bank, called the *Portuguese Bank*, lying to the eastward of the Patches.

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* Impressions of Western Africa, by Thomas J. Hutchinson, Esq., 1858, p. 101.

Jew-jew Point is only a mile within Rough Corner; and at 3 miles higher, on the same side, upon the western bank of a creek, is the town of BONNY. On the opposite bank, North of the latter, is the point and town of *Peter Fortis;* below which, on the same side, is a bank dry at low water.

Four miles from the mouth on the East bank of the river is situated the town of Bonny, called by the natives Culomi. The king and a few of the principal chiefs have their houses close to a creek on the North side of the town, which, during the rainy season, is full almost to overflowing, being nearly on a level with the floor of their houses. On paying visits, it is customary to pull up this creek in your boats, and land at the outer courts of their houses by pulling the boat alongside a pier of wood and clay embankment, and stepping from the gunwale into the court. During the dry season the creek is nearly dried up.*

These rivers were long noted as marts for the slave trade,† and are equally so for palm oil, &c. The common Manchester cloths, it is said, suffice for this place, with guns, powder, iron, neptunes, or brass pans, crockery ware, &c.

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* Trade and Travel in the Gulph of Guinea, by J. Smith. A gossiping book, published at Easingwold, Yorkshire, 1851.

† When this infernal traffic was active, it was computed that for twenty years not less than 20,000 persons were annually sold here, 16,000 of whom were natives of the country of *Heebo,* or *Eboe.* The remaining part were of the *Allakoo,* or *Brass Pan Country.* Fairs for the purpose were held every five or six weeks, at several villages on the banks of rivers and creeks in the interior; and large canoes, carrying 120 men, were employed in the navigation. The Heebos must inhabit a very populous and extensive country, and it is probable that the towns, at the mouths of the rivers along the coast, including New Calabar and Bonny, were peopled from the Heebo country. Amacree, king of New Calabar, and Peppel, king of Bonny, were both of Heebo descent, as well as many of the principal traders at both places.

These towns were probably first built and occupied for the purpose of obtaining salt, by the evaporation of sea water: because the country, from the sea board to 50 miles in the interior, is a vast morass, heavily timbered, and unfit, without excessive labour, to produce sufficient food for more than a scanty population; and as the trade in slaves increased, these towns, particularly Bonny, grew into importance. The language also spoken at these places varies but little from that spoken by the Heebos, which proves a common origin.

The Heebos, in their persons, are tall and well formed, and they may be distinguished from other Africans by their skin having generally a yellow, bilious cast, although varying, in some instances, to a deep black. Their dispositions are naturally timid and desponding, and their constitutions delicate.

The neptunes, or large brass pans, essential in the trade with this coast, are used, during the dry season, by the creek and surrounding country people, for the purpose of evaporating sea water, to obtain its salt, which is here the medium of exchange, and a great trade is carried on with the interior country.—*Adams.*

Dr. W. F. Daniell, whose ethnographical acquirements make him an authority on these subjects, says that the different tribes inhabiting that maritime expanse of country comprehended between the Rio Formosa, in the Bight of Benin, and the Old Calabar River, have unquestionably derived their origin from one common stock. . . . The great parental source from which most of them have emanated are the Ebo's of the Quorra, which, for the sake of perspicuity, it will be necessary to separate into three distinct classes.

1st. The Ebo's Proper, which include the natives of the Rio Formosa, Warree Island, Rio Escravos, Brass Town, and the Quorra generally.

2nd. The Ebo's of the table land between the Quorra and Cross River, comprising the natives of New Callebar, the Bonny, and a portion of the inhabitants of the River Andony.

3rd. The Ebo's of the country between the Andony and Old Callebar Rivers, which embrace the habitants near the coast, the natives of the several towns of Old Calabar, and of the entrance of Cross River.

"The entrance of the Bonny presents a broad expanse of water, consisting of the mouth of the Bonny to the eastward, and the New Calabar to the westward. The former is the more considerable of the two, although they are both fine rivers, and can be entered at any time of tide by vessels drawing from 12 to 18 feet of water. They are likewise deep inside, and the anchorages safe at all seasons of the year. On account of the great commerce carried on in the Bonny, *King Peppel* (who resides at Bonny Town, on the eastern bank of the river, near its mouth) possesses great wealth, and in his vanity assumes various titles, of which "Conqueror of the Calabar" is the most remarkable. Notwithstanding his large magazines, full of goods and specie, he always pretends to be poor; probably from the fear that were he known to be rich some power, superior to his own, might be induced to attack him and his possessions for the sake of plunder. These magazines are at some distance from Bonny Town, but their exact situation is kept a secret from strangers."—*Captain Vidal's Narrative, Owen*, Vol. II., pp. 383—5.

Upon the condition of Bonny, another officer of talent (H. B. R.) has written as follows:—

The entrance to the River Bonny is extremely intricate, and I would recommend to all ships to receive a native pilot before they attempt it. These fellows are provided by the king for that purpose, and upon application to his kingship one is instantly sent, without any charge being made, although it is customary, if he performs his duty well, to make him some trifling remuneration; but this is not always the case, as, from ignorance or idleness, accidents frequently happen.

The chief produce of this place is palm oil, which must be very plentiful. This traffic is, however, attended with much danger to the immediate aetors; and great difficulty is experienced in obtaining seamen for the ships, as it frequently happens that few of the original crew return from that fatal coast. They sometimes lie for a considerable time before they complete their cargo, and, during this period, the greater part of the ship's company not unfrequently become victims to the pestilential climate.

The method of commencing trade in the River Bonny deserves notice. When a ship arrives, let her object be what it may, ivory, palm oil, or slaves, all have to undergo the same ceremony. Before a single act of barter is allowed, a *dash*, as it is termed, must be made to the king, which, being interpreted, means a handsome present. This takes place with all the pomp imaginable; a few days after the vessel's arrival, his kingship is invited on board to a *déjeuner à la fourchette*, when all the masters of the different ships are mustered to meet him. He then embarks in a large canoe, rowed by about thirty paddles, while he sits with all the pomp and dignity of the King of Bonny, on a kind of rude throne or chair, rigged up in the afterpart, and dressed in his robes of state. Upon his arrival on board, he is received in due form, and handed to the breakfast table by the captain. Immediately he is seated he falls to and eats, like any other hog, until his powers of receiving, but not his inclination, are exhausted; when this effect is produced, the dash is brought forward and spread out for his inspection. It generally consists of various articles, such as muskets, casks of powder, beads, bushels of salt, and stuffs of various descriptions. If the intended offering meets with his approbation, he gives a grunt to that effect, when the goods are handed into his boat. He then takes a parting glass or two, before embarking his own fair form, from the effects of which he is generally slung in a rope and lowered to the canoe, where,

"The world forgetting, by the world forgot,"

he is rowed ashore, to wallow in the mire of which nature made him.

Immediately after this ceremony trade is allowed to begin, and the coopers from the palm oil ships may then go on shore and set up their casks, which are put into the trading canoes and taken many miles up the country. They frequently return in the course of a week with two or three puncheons, which they procure for similar articles to those mentioned above. The average import of this oil into the port of

Liverpool for some years past has been about 12,000 tons per year, value about £400,000. Three-fourths of this oil are exported from the Bonny and the other outlets of the Niger, and it gives employment to 12,000 or 15,000 tons of shipping per annum. The price of palm oil, duty paid, varies from £33 to £34 per ton (1842).

The country surrounding this town is low and swampy, and at this season of the year (March) particularly unhealthy. The merchant vessels were losing many men daily, although every precaution was taken to prevent disease. They were nearly all covered in, and the men not allowed to go on shore or work in the sun, which is the chief enemy to the constitution in this climate.

The river abounds with sharks of an enormous size; and, from the respect which is paid them by the natives, they are quite domesticated. This, however much it may be admired in some animals, is not at all a pleasing trait in the character of a shark, and the domestic monster of this species is quite as disagreeable in his mode of mastication as his less polished brother of the deep. The inhabitants of the New Calabar worship this sagacious monster, which they call their *jew-jew*, and seem to consider that the nearest way to heaven is through the digestive organs of a ground shark. In consequence of this devotion paid to the shark, it is considered in the New Calabar a great crime to kill him; for they say, " Who kill jew-jew, him go dam—but who jew-jew eat, him go *comartable*;" an odd idea of comfort, but *chacun à son goût* (each to his taste), as our polite neighbours say. These animals appear so well aware of their prerogative of protection, that they commit the most daring acts, and have been known to leap some feet out of the water to get hold of the men whilst working in the head of the vessel, thinking, no doubt, that they were fit subjects to be *made "comfortable,"* as they had just undergone the process of ablution. Falling overboard is certain destruction, as they keep a constant watch upon all vessels lying in the harbour. The shark is esteemed a great delicacy at Bonny, and whenever it can be caught is greedily devoured, the fetishe of Bonny being the *Guana*.

Stock of all kinds (and even yams and plantains) is now very difficult to procure in Bonny, without paying a most extravagantly exorbitant price for it, and even then it cannot be procured in any quantity; vessels should therefore purchase their fresh stock, corn, &c., to windward. Pigs and poultry can be purchased tolerably cheap in barter at Frisco, Cape Lahou, Quitta, or Popoe. Iron bars, leaf tobacco, common kinds of Manchester cloth, gunpowder, and rum, are sure to be asked for. Knives and axes are also in demand. If the vessel is much pressed for time, it may be better to call at one of the settlements on the Gold Coast, where stock of all descriptions, with the necessary diet, can be *immediately* procured, particularly at Accra.

Bonny River abounds with many kinds of large and excellent fish, which is the only fresh diet which can be procured at anything like a reasonable price; but even fish cannot be always obtained, as this article forms the principal, indeed universal, diet of the natives. I believe the whole of the fish taken in Bonny are perfectly wholesome food, without a single exception.—*Captain Midgley* (1841).

DIRECTIONS, &c.*—It is the general practice of the pilots, in going into Bonny with a heavy ship, to bring Foché Point about N. ½ W., and steer towards it in that direction, keeping the point directly ahead, until they shoal the water to about quarter less 4 fathoms, when Bonny River will be pretty well open—say about the length of a ship's main-yard; they then edge away along the western breakers, giving them a large berth of half or three-quarters of a mile, and keeping Peter Fortis Point well open of Jewjew Point, which is their mark for the Outer Bar. When over the Outer Bar, the water deepens to 4½ and 5 fathoms, and they then keep away to the eastward, until Peter Fortis comes about the length of a long walking-stick open of Jewjew Point, which is the mark the pilots use for crossing the Inner Bar. After passing the Inner Bar, and when the water deepens to 6 and 7 fathoms, which it does very rapidly, the points may be kept a little more open, giving the dry sand bank on the East side a berth of one-third the breadth of the channel, until the vessel is fairly in the river; when by giving the eastern shore a berth of a large half mile, the vessel will be clear of all danger, and will sail in 9 to 11 fathoms water, up to the shipping lying off the town of Bonny.

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* The following Directions for the Bonny are by Captain Midgley, 1842.

The western side of Bonny River is very shoal to half its breadth across. All vessels must therefore keep the eastern side aboard after passing Rough Corner. The ship must be steered with great judgment; for in the channel, upon and near the Inner Bar, there is very little room for a large ship to yaw about. The soundings on each side the ship will sometimes vary 18 inches.

After passing the Inner Bar, if the wind is well free and light, and the tide of flood runs strong, steer well to the eastward, towards the dry sand bank, as the flood runs through the Lee Channel in a W.N.W. direction, and taking the vessel upon the beam will set her over towards the western breakers, if this is not attended to. To the N.E. of the Inner Bar these breakers are very bold-to, having 4½ and 5 fathoms within a ship's length of them. To the northward of Breaker Island (a dry sand on the West side of the channel) the flood tide runs directly to the N.E. by E. into Bonny River.

In case of the ebb tide setting out of Bonny, a vessel may anchor anywhere in the fairway of the channel, to the *northward* of Breaker Island, as the ground is everywhere clean and good; but the tides are very rapid, and the ship will not lie very easy on the ebb.

A good survey of the Weather Channel into Bonny is really very much wanted, for no such water can be found at low water, as is laid down upon the Admiralty Chart of 1826. Some alterations have certainly taken place, for to my own knowledge Breaker Island is every year increasing in size; and there is now a breaker at low water, near the N.W. elbow of the Baleur, which has only appeared within the last three years.

The Lee Channel has been well surveyed, and the soundings in it, on the Admiralty Chart of 1826, are perfectly correct. The channel or swashway, next to the East end of the Baleur, and generally called the "Man-of-War Bar," has, I think, of late years gradually increased its depth of water. The Portuguese Bar is now seldom used, except with vessels of a moderate draught of water, and then only with a wind too scant for the Man-of-War Bar.

The dry sand bank, to the eastward of the channel leading into Bonny, is also extending itself in a semicircular course to the S.E. and E.S.E.

The Bonny pilots say there is a sand bank growing up in the Weather Channel. It is certain that vessel rarely come through it, without having a cast or two of 3 or quarter less 3 fathoms of water on the Inner Bar. This channel should never be attempted with a vessel drawing more than 17 feet, and then only at the last quarter of the flood tide, and under favourable circumstances of a commanding breeze and smooth water. In the wet season 16½ feet will be found quite deep enough. The Outer Bar of Bonny has 2 or 3 feet more water than the Inner Bar.

The pilots are well acquainted with the channel, but require to be a little humoured, and spoken to mildly, and they must not be entrusted with the management of the vessel; all they ever do, is giving directions for the best water in the channel.

The pilot's canoe frequently goes ahead to sound the channel, and make signals of the depth of water by waving a flag. They are very expert at this, and the soundings they give may be depended on; but care must be taken to examine their lead line, before the canoe leaves the ship, as it is rarely found correctly marked. The canoe never goes ahead but when the wind is scant, the weather is hazy, and the marks on the land obscured, or when the vessel is of great draught of water.*

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* Do not send into Bonny for a pilot late in the afternoon, or after four o'clock, as several boats belonging both to men-of-war and merchantmen have been capsized, and their crews

It is dangerous to attempt entering the river with a scant wind, as the tides of both flood and ebb set athwart the channel, the flood running to the N.N.W. until it meets with the W.N.W. branch coming through the Portuguese Channel. The N.N.W. branch of tide sets into New Calabar River. The tide does not run fairly into the Bonny River until the vessel has got to the N.E. of the Portuguese Channel and of Breaker Island. The ebb tide runs about S.E. over the Bar.

No stranger, even under the most favourable circumstances, should attempt going in without a pilot.

When the pilot's canoe is alongside, everything not too heavy or too bulky for transit should be well looked after, however worthless the articles may be.

On leaving Bonny River outward bound in a large ship, anchor in 5½ or 6 fathoms at low water inside, or to the northward, of the Baleur Sand, with Rough Corner bearing about N. by E. ¾ E. (*here* the tide rises and falls 9 feet); in this berth you will be nearly a mile from any danger, and 2½ miles from the Bar in the S.S.E. The closer a vessel anchors under the Baleur, having due regard to her draught of water, the better, as she will find easier riding, and be so much further to windward; both essential points. At this anchorage the tide runs considerably stronger on the ebb than it does inside the river, owing to its being joined by a branch of the tide out of New Calabar, and in consequence great caution is required in bringing up. The starboard anchor will be found most convenient for working; and the vessel should be rounded-to with her head to the southward, as she will find less effect in bringing up from the tide setting to the S.E. By coming-to with the starboard anchor, the chain will be clear of the stern, and consequently be hove in much easier on the flood tide. The flood at this anchorage rarely runs above 2½ knots, and may consequently be run over with a moderate breeze. From the general anchorage above described, the course over the Man-of-War Bar will be about S.S.E., having regard, however, to the direction of the wind and strength of tide; but as a stranger cannot well get out of Bonny without a pilot, I shall merely state that vessels drawing 15 feet may safely weigh, to cross the Man-of-War Bar, at two hours flood, as it will be half flood by the time they reach the Bar, at which time there ought to be 3½ fathoms water. Vessels of 18 feet draught should be upon the Bar about 4½ hours flood, when they will find 21 to 23 feet water in the fine weather season, provided they are in the fairway of the channel. The Portuguese Channel has 3 feet less water than the Man-of-War Bar. In the wet season the sea runs very high, and often breaks directly across these channels. It may be well to have a 40-gallon cask all ready slung, with about 20 fathoms of good rope attached to it, to be used as a buoy if necessary.

After passing the boat or buoy, which it is customary to moor on the elbow of the Baleur, steer S.S.E. for about 2 miles, then S. by E. These courses will carry a vessel through the deepest water over the flats outside the Bar; and upon these flats are many small knolls of sand, which cause the soundings to fluctuate 1 or 2 feet. In crossing the Bar and flats carry all possible sail.

In getting under weigh from the above anchorage, canvas must be set upon the vessel before heaving in too much cable, to prevent her drifting to leeward.

A ship will be clear to the eastward of the Bonny Flats when Andony River bears N.E.

No wind to the southward of S.W. by S. will allow a vessel to get off the coast, if there is much sea.

After passing the Bonny Flats into 6 or 7 fathoms water, haul upon a bowline, if

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drowned, owing to the tide imperceptibly sweeping the boat amongst the breakers. After the ship is at anchor fire several guns, and perhaps they may be heard by the pilots. If it be daylight, let the royals hang loose, and the ship may be seen by some of the fishing canoes inside the Bar. After all, the only certain and most expeditious way of procuring a pilot is to send a boat into Jew-jew Town.

there is no intention of calling at Fernando Po; but if so, steer a point to the southward of the direct course, to allow for current.

After a tornado, in the dry season, the high land of Fernando Po has been very frequently seen from the weather Bar of Bonny River, at the distance of 100 miles.

Vessels from Bonny often weather Fernando Po on one board, in which case they have still a long reach on the starboard tack. A day or two of experience in the Bight will enable an observant man to take advantage of the periodical changes which so frequently occur in the dry season.

From BONNY RIVER the land, which continues low, trends E. by S. [*E.* ¾ *N.*] 5 leagues to the entrance of *Andony River.*[*] This river is blocked up with the hard sand bank, on which are breakers.

RIVER ANDONY.—"This river was formerly called the San Domingo, or Rio Dony. This stream leads to the short Ebo country, a race inhabiting a range of table land, about 40 miles up the river. It also leads to the countries of the Mocoes and the Quas, in the latter of which the customs and language are almost identical with those of Old Calabar. There are two or three insignificant villages a few miles inland on the margin of the eastern bank."[†]

From Andony River to the entrance of Old Calabar River, the coast trends E. ¾ S. [*E.* by *N.*] 20 leagues. The whole is very low, and covered with trees. It is bordered with sand, and exhibits no particular marks. The western point of Old Calabar River is known by the name of *Tom Shot's Point.*

OLD CALABAR RIVER.—The entrance of the Calabar, or Old Calabar River is between Tom Shot's Point on the West, and *Backasey*, or *East Head*, on the opposite side. The distance between is 10 miles. The position of Tom shot's Point, as given in the survey by Captain Vidal, is lat. 4° 36' N., long. 8° 19' E. A break in the East Head, called *Backasey Gap*, is in lat. 4° 29', long. 8° 32'. Variation, in 1826, 20" 3' W.

"Effeat, or Tom Shot's Town, is a dirty and unimportant village erected within the curve of the beach, and encompassed by Mangrove woods, which conceal it from view. Its inhabitants possess extensive fisheries, of which the chief product, a species of *silurus*, is smoked and cured in immense quantities for the remote markets of the interior."—*Dr. Daniell*, p. 103.

The following directions are among the last works of the late Captain Midgley, of Liverpool, a gentleman who has done so much for the hydrography of the Bights. As they are the result of his personal observations, we believe that they may be *implicitly relied on*:—[‡]

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[*] See the particular plan of the River, &c.

[†] Dr. Daniell, "Medical Topography," &c., pp. 101, 102. He continues:—"Few individuals are aware of the fact that inland communication by water may be established between the Rio Andony and the Rio Volta without the necessity of undertaking a sea voyage. The route, per canoe, may be described as follows:—1. From the River Andony to the River Bonny; 2. Thence to the New Calabar; 3. Thence to the Quorra by the creek below the town; 4. From the Quorra or Nun to the Rio Formosa, either by the River Broadway, below Ebo, or by the numerous petty creeks connected with the River Esclavos, all of which communicate more or less with the Benin: 6. From the Formosa or Benin River to the town of Lagos by the Lagos Creek (passing East Lagos River and the Oradoo Lake); 6. Thence by West Lagos River by Badagry to Whydah and Grand Popo; 7. And thence by the creeek and salt water lake past the Fort of Quitta to the town of Aooneh, and from thence to the Rio Volta. *Ibid*, p. 102.

[‡] These directions coincide with those given by M. le Comte Bouet-Willaumez in the Annales Maritimes, 1848. The first of these are by M. E. Leps, Lieut. of *La Vigie*, whose description of his entering caused the mission of Lieut. Ph. de Kerhallet to make a slight hydrographical survey of it, accompanied by complete sailing directions, as given in the same work, pp. 157—165.

In approaching Old Calabar River from the *westward*, there are several difficulties which require great caution. The principal of these are the strength of the tide (the flood setting E.N.E., and the ebb in the contrary direction, that is to say, diagonally over the Tom Shot's breakers), shallow water, low land, and very irregular soundings.

The Tom Shot's Breakers extend at least 10 miles in a southerly direction from the land; and at 2 miles from their extreme end there is a bank of only 14 feet, and perhaps less water, hard sand, upon which the barque *Kingston* struck very heavily in December, 1842. At a short distance to the southward of this bank there is 4 fathoms water, over a mixed bottom of sand and mud, and 3¼ fathoms, hard bottom, *quite close* to the South edge of the bank.* Vessels approaching from the westward will shoal the water quickly from 10 fathoms, and the bottom will be found getting harder; and this alone will be found quite sufficient to indicate the proximity of the Tom Shot's Breakers. Should a cast of 7 fathoms be obtained (no matter what quality of bottom) a vessel should *immediately* haul to the southward, keeping in no less water than 6 fathoms, until the East Head of the river bears N.E., or N.E. ¾ N., and bearing in mind to haul to the southward whenever the bottom becomes hard; and when East Head bears N.E., or more northerly, a vessel of 20 feet water may anchor upon soft bottom in 5½ fathoms, with perfect safety at any time of tide.

There are two swashways through the Tom Shot's Breakers, both of which lay pretty close to the land; but although one of them has a fine open appearance, I fear that neither of them can be recommended as more than boat channels until they are better known, and I merely notice them here as they may be the means of saving human life in cases of vessels driving ashore to the westward of the breakers. Several boats have reported 4 fathoms water in the widest swashway; but the pilot states that he has found only 2 fathoms in various places, and that the ground is hard and very uneven.

Several vessels have got into a very dangerous situation to the westward of the breakers, and were not extricated without much difficulty and detention.

But for vessels bound to Old Calabar, it is in all cases better to make the Island of Fernando Po, and having obtained a departure, approach the river from the *southward*, allowing in the course for 1½ mile per hour of easterly current in the wet season. On nearing the river, the water will shoal rapidly inside of 9 fathoms (the lead should be carefully attended to inside of 15 fathoms), but with daylight and correct soundings there is no danger, if it is borne in mind, as a constant maxim, NOT to raise ANY of the trees upon the Tom Shot's land more than just to be seen topping upon the horizon in detached places to an eye elevated 18 or 19 feet above the water, until a ship is sailing over the outer bar, or, in other words, until the East Head of the river bears N.E. ½ N. or thereabouts.

A vessel drawing 18 feet water, *when outside the bar*, will be quite close enough to Tom Shot's land when the *extreme* tops of the trees appear like detached umbrellas upon the extreme verge of the horizon, when seen from the poop deck of the ship, or 18 feet above the water in clear weather.

There is no danger whatever in the way of approaching East Head upon a N.E. ½ N. bearing, as any vessel may gradually approach any required depths of water for anchoring, upon an excellent bottom of soft mud, from which the water gradually shoals upon the same bearing to the outer edge of the great mud flat, which forms the outer bar of the river; upon this bar there is said to be 6 feet rise and fall of tide (but I think this is rather over-rated), and the pilot says that it is high water at sunset, on full and change, or about 6^{h}. In the wet season the ebb runs longer than the flood, but there is at no time less than 16 or 16¼ feet water in the fairway over the outer bar, even at low water of ordinary springs; and as the *fairway ship channel* is all soft mud, a good ship would receive little or no injury even if she should lay upon the ground for a tide, this bar being similar to that of Demerara.

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* The following account of a shoal at the mouth of the river was forwarded to Captain H. D. Trotter, R.N., from Captain Becroft, dated October 29th, 1851:—

"The knoll with 2 fathoms water upon it is due South, from the South end of Tom Shot's reef, about 2 miles distant. To avoid it in coming from the westward, steer East in 8, 9, or 10 fathoms. If the weather is clear so as to see East Head, get it N.E.; then steer N. by E. from the river of Old Calabar. All the rivers in the Bight want surveying. Knolls and sand banks get up and disappear in two or three years. Breaker Island is larger now, with trees on it."

Tom Shot's Point is a low and level elbow land, gradually rounding off to the northward, and has no point or protuberance whatever; except, indeed, the entrance of a narrow creek, at the extreme northern termination of the Tom Shot's Breakers may be called so. On the banks of this creek stands the *town* of Tom Shot's (which I consider as situated upon Tom Shot's Point); and at a mile or two to the northward of Tom Shot's Town there are two enormous trees, standing about three-quarters of a mile or a mile nearly North and South from each other, and which, from their immense height, size, and spreading foliage, form a very conspicuous mark, and when seen from the offing really appear as if standing upon the nearest part of Tom Shot's Point.

The following remarks were made on board the ship *John Campbell*, of Liverpool, myself master, bound to Old Calabar, and drawing 18¾ feet of water, with a pilot on board (Mr. Hogan, the principal pilot of Old Calabar), a native of the country, but a man of great ability, and sound professional judgment, and as well acquainted with the soundings and set of the tides as any European pilot can be in his own district.

Friday, 12th April, 1844. Civil Time.—At five days before the new moon, and at one hour after high water, made sail from the outer anchorage, in 5 fathoms water, with the East Head of Old Calabar River bearing N.E. ½ N. Wind light and moderate from S.W. by S. to W.S.W.; vessels steering in towards East Head upon a N.E. ½ N. course, and gradually shoaling the water to 3¾ fathoms, with soft, and sometimes but very rarely, a sticky bottom. Upon this course gradually rose the Tom Shot's Breakers on the port bow and beam, and still having 3¾ fathoms water all over the bar at half ebb. Ship steering gradually a little more to the northward, having the line of breakers well in sight from the deck, but making a little way in consequence of the decreasing breeze. The approach of a vicious looking squall, coming down the river, induced me to anchor in 4 fathoms water, mud bottom, at 4½ hours ebb, with the western point of the Rio del Rey, then in sight, bearing S. 76° E., and the S.W. extremity of the Tom Shot's Land, N. 52° W. (these bearings taken on the ensuing morning by an Azimuth compass); here the Backasey Gap is very nearly shut up, and the entrance of the Backasey River (*Big Backasey*), appearing quite open, bears N. 45° E., the bottom a soft, dark, olive coloured mud, and excellent for holding, as the ship never started her anchor during a severe land squall of two hours' duration. This anchorage is only about half a mile from the inner edge of the bar, and should only be used in case of necessity, and then, if possible, only at neap tides, except the vessel draws only 16 or 17 feet water. At low water the ensuing day, weighed the anchor with a very light air from the southward, boats towing ahead, and ship steering in North, keeping 1¾ or 2 miles from the breakers on the port beam, carrying 3¾ and 4 fathoms, soft and sticky bottom, until one hours' flood. When Backasey Gap was quite shut up, the vessel was in 25 feet water at one-quarter flood, bottom of a sticky, but rather soft, black mud, of excellent quality for holding an anchor. This is an excellent place for a vessel to anchor and wait for a pilot; or by continuing to steer on North, and constantly sounding, keeping more to the eastward as the bottom becomes hard or sticky, a ship may continue to steer in, until all the land on the West side of the Rio del Rey is shut up behind a small projection or headland which lays a little to the *eastward* of Backasey Gap, at which time the gap itself cannot be seen and in the fairway channel there are 4 fathoms, on a soft muddy bottom at low water springs. Here a ship will be well inside the bar, and in smooth water. Nearly abreast of this anchorage, and with Big Backasey River a very little shut up to the northward (but still seen well open), lies the South end of a long but narrow bank of hard sand,* having a good anchorage on either side; and this bank extends nearly North and South to its extreme North end, which shelves gradually off in a N.N.W. direction, until it is lost in the muddy bottom which prevails off the mouth of Great Qua River. The extreme North end of this bank lies with Great Qua River completely open, and there are spots upon it of only 15 feet water at low water springs. The pilot says the tide out of Great Qua is gradually wearing this bank away. When the Big Backasey River is seen well open, continue to steer up North, or N. by E., as indicated by the hard or soft bottom (always keeping to the eastward as the ground becomes hard), even perhaps so far as N.N.E. ½ E., and, perhaps, as much to the westward, according to the position of the ship and the strength of the tide, and the ship will be sailing in 4 to 5 fathoms water at half flood.

Parrot Island will be seen before this, on the port bow, thickly studded with tall and remarkably level trees, of a very verdant appearance, so level, that the trees will appear like a well-clipped garden hedge, and apparently growing out of the water; indeed, it is scarcely possible to find an uncovered spot upon Parrot Island at high water. When Parrot Island is indistinctly made out from the deck, and the little slow slanting points which jut out from its ends are seen, steer well to the eastward, into 4 fathoms, soft bottom, towards the mouth of Great Qua River, which may be known by a low bushy and verdant prominence on its South side, and which, at a distance, looms like an island. On approaching Great Qua River, the soundings will increase, at half flood, to 5 or 5¼ fathoms, and become more sticky, and perhaps hard, and the land to the northward will be seen coming open of the N.E. end of Parrot Island: continue to stand on towards the northern head of Qua River, until Tobacco Head is just seen coming open of the N.E. end of Parrot Island, when the course must be *immediately* altered so as to keep Tobacco Head directly ahead of the ship, or a little on the port bow, and steering up about N. by W. ½ W., or N.N.W., taking great care to keep Tobacco Head constantly in sight.

Now bear in mind that, in steering up as above,† the first land which will be seen, coming open of Parrot Island, is Alligator Island; then a small gap, next to which is Tobacco Head, sloping down to the eastward, and looking like a low and level, yet prominent, headland. When Tobacco Head is seen about 2 or 3 feet open of Parrot Island, steer up towards it upon a course of about N. by W. ½ W. to N.N.W., according to tide; keeping the above mark on, but gradually opening Tobacco Head a little more as the ship approaches Parrot Island. This mark will lead clear between the sands, which extend southward from Parrot Island and the shallow mud banks on the eastern shore; and the soundings must be taken correctly and briskly, and be carefully attended to, hauling a little to the eastern side of the channel, when the ground feels hard. You will thus pass over Bua Flats in not less than 3½ fathoms at half tide; and as the water gets deeper, the ship will be nearer to Parrot Island, and may keep Tobacco Head seen largely open; and, as you find the water deepen, haul up more towards Parrot Island; and, when in 5 fathoms water, steer along Parrot Island, giving it a berth of a quarter to half a mile; run along the eastern shore of Parrot Island at half a mile off, until near its N.E. end, when the ship should haul over towards the N.N.W. end of James' Island, which may be approached to 250 fathoms; and in steering across, the water will again gradually shoal to 3¾ or 3½ fathoms: now keep pretty close to the extreme N.W. end of James' Island, and steer towards Seven Fathoms' Point (a bluff and bold looking land, with trees growing to the water's edge, and bearing about N. ½ E. or N. by E. from the ship), when Parrot

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* My information relative to this bank I received from the pilot (Hogan); and, as several shipmasters denied its existence, Hogan was ridiculed no little about it. He told me, however, he would convince me of the truth of his statement when he piloted me down to sea, and this he actually did do, by crossing the bank several times at one hour's ebb, in less than 3½ fathoms, bottom of hard sand, the *John Campbell* then drawing 19 feet.—T. MIDGLEY.

† If Tobacco Head be again shut up behind Parrot Island, the vessel will be in danger from the Parrot Island Hook and sandbanks. The vessel must be steered very carefully here to keep in the deep channel.

Island will be seen, a moderate sail's breadth open of James' Island, and the passage between will look like the entrance of a dock. Keep this latter mark on, and you will pass James' Flat in 16½ feet at low water; but steer small, as the channel is very narrow; and, when the water deepens to 4½ and 5 fathoms, steer on for Seven Fathoms' Point, which is very bold-to, and may be approached as near as you please.

Give Seven Fathoms' Point a berth of 60 or 70 fathoms, and, as you stand on along the Bush, you will immediately see the E.N.E. or Duke's Town reach of the river come open. Now haul across the river, and when the ships can be seen laying before Duke's Town, or you can see along the southern shore of the river. steer directly across the river for a part of the land laying halfway between a remarkably wide and conspicuous creek, and the first clump of tall trees. Steer along the North shore at the distance of 60 or 70 fathoms, as it is bold-to; and when Henshaw's Town comes open of the bushes, steer towards Cobham Town, and take up any convenient berth in 19 to 24 feet at low water, pretty close to the beach in front of Duke's Town.

On passing Seven Fathoms' Point it is customary to salute with three guns; and also to fire guns on passing Henshaw's Town. Immediately on anchoring off Duke's Town, the customary and required salute is 7 guns, which is returned by 7 guns from the beach.

The tide at Duke's Town flows at 7^h, full and change, and rises about 6 feet. During the rains, the ebb tide on the surface runs longer than the flood; but I have very often observed, and carefully noticed, that the tide rises nearly a foot at springs, before the ebb has done running on the surface; that is, the flood tide, as I think, first runs up underneath, and swells the water. In the wet season the ebb tide runs with great force, bringing down enormous trees, and sometimes small islands of vegetable matter, for which a careful look-out should be kept, as it is dangerous to have such a mass laying across a vessel's bows in a strong tide, to say nothing of the difficulty and labour required to get clear from them: and I have known several instances of vessels having their copper sheathing rubbed off, in consequence of large trunks of trees coming into contact with, and rubbing under, the ship's bends and bottom.

Below Parrot Island, the great strength of the ebb tide setting out of the various creeks and inlets will be found to require much precaution, particularly between Great Qua River and Tom Shot's Breakers, for here the freshes run with so much force (setting directly over the breakers), that if a vessel once starts an anchor, it may be difficult to bring up again, especially if a ship happens to drive near the breakers, where the bottom is all of hard sand.

The salt water flows no higher than Parrot Island; from whence, to Seven Fathoms' Point, the water is brackish; but at Duke's Town it is quite fresh.—T. MIDGLEY.

We shall conclude these notes of Captain Midgley's with the results of some observations he had taken for the position of Duke's Town. The whole of the upper part of the river had been represented most enormously in error; the difficulty of obtaining observations in this terrible climate has prevented more accurate data from being afforded; and it is to the indefatigability of Captain Midgley that we shall, in some degree, be enabled to improve the charts. Duke's Town has been represented as in lat. 5° 40', or 5° 42', long. 8° 27' E., which position has been recently repeated. But in December, 1844, Captain Midgley, by means of the quicksilver horizon, has placed it thus:—December 15th, 4° 57' 2" N.; December 20th, 4° 57' 25"; and December 21st, 1844, 4° 57' 21" N. The mean of these results referred to the principal landing place at Duke's Town (generally called "Eyamba's Landing") will place it in lat. 4° 57' 30", or 4° 57' 40". The longitude or the same by lunars, and two chronometers, 8° 19' 15". This correction will prove that the distances on the chart, in the upper parts of the river, have hitherto been made *three times* too great.

"On the eastern bank, about 5 miles from Seven Fathoms' Point, the mangrove woods stretch to the village of Henshaw Town, where the land suddenly rises. This place consists of little more than a dozen houses, erected on sandy patches, divested of their dense herbage. The population is near 200, mostly dependent on the chief from whom the village derives its title. A long and narrow path leads to the river, fringed on both sides with the forest brushwood, and on its lower slopes by a sward of thick grass, amid which are the graves of a few Europeans. Adjoining the landing place of this hamlet is the outlet of a spring of fresh water, from which the shipping is supplied. It is not an easy matter to discover this watering place, on account of the tangled thickets that encompass it. From this spot a somewhat precipitous and closely wooded eminence, about 200 feet in altitude, encroaches on the river, and constitutes the southern limit of the Old Calabar Town.

Attarpah, or River Town, the metropolis of these regions, is pleasantly located upon an easy acclivity, within a semicircular amphitheatre, facing the river, having a background formed of verdant woodland of moderate height. The town is chiefly built on an inferior slope, the houses being clustered together in irregular groups that approximate close to the beach. The streets, in their outlines, are similar to those of the other African towns previously adverted to, and are merely tortuous and intricate byepaths, rendered difficult to thread, from the mud walls and foliaceous fences of the adjacent domiciles effectually concealing all objects but the arid sand with which they are strewed. The houses of Old Callebar are far superior in their construction to those of any other nation in the Bights."—*Dr. W. F. Daniell.*

"The most remarkable houses are the massive wooden mansions of the king and chiefs. They have been originally built at Liverpool and Fernando Po, and been reconstructed by European carpenters. They are spacious within and elegantly fitted up with magnificent mirrors, chandeliers, &c., intermingled with expensive articles of *bijouterie*. They serve as the ordinary lounge of the white traders, and are excellent temporary hospitals for the white valetudinarian.*—*Ibid.*

Duke's Town, or Old Calabar, is the place at which vessels trade, and off which they are moored. This place is about 25 leagues from the sea, on the S.E. bank of the river. The land about it is moderately elevated, dry, and habitable. The people of this and the neighbouring towns have, for a long period, dealt in the productions of the soil, and exported annually great quantities of palm oil, besides barwood. The oil is purchased by the tub (*cruee*, or *crew*) of 9½ gallons. The price varies according to the demand.† Salt being always in demand, vessels from England may take of that article the amount of their register tonnage, beside a well assorted cargo of other goods. The currency of the country is copper rods. Many of the natives here write English; an art first acquired by some of the traders' sons, who had visited England, which they have had the sagacity to retain, having schoolmasters who instruct in this art the youths belonging to consequential families.

Strangers to the river may come to an anchor off the entrance, and send up to Duke's Town for a pilot, who, though incapable of conducting the ship, will point out the proper channel; and trading vessels are required to obtain one by the ceremony of a letter to the Duke of Calabar, without which the trade may not be free.

Much form and ceremony among the chiefs is required before a vessel is allowed to trade. The practice has been to salute with two guns at Henshaw's Town, and seven at Duke's Town, where a formal visit, to announce your arrival to the Duke or Chief, is required. From this application the king will, on the following day, proceed on board to receive his *comey*, or *custom*, which is exorbitant, but indispensable. The measures in use are the cruee and powder-keg. The cruee, of 9½ gallons, serves for oil, salt, and pepper. The powder keg contains little more than half a pint. The *comey cruee*, for salt, contains 5 lbs. only. A good supply of rum is necessary, in order to give a proportion to each trader, besides a small dash, or present, of cloth.

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* Note.—For strangers bound to Bonny, or the New or Old Calabar Rivers, it is decidedly the wisest plan to go to Fernando Po, where for a few dollars a trustworthy pilot may be procured. This will perhaps save the ship four or five days, and avoid other misfortunes, which are so difficult to be remedied here. The Mail steamers always take a pilot from there.

† See Adams, pp. 113, 114; and Bold, pp. 75—81.

The OLD CALABAR has been ascended in a steamer by Mr. Becroft and Mr. Oldfield, who went above Duke's Town and the villages called *Guinea Company*, but found that it is a river quite unimportant, beyond the influence of tide. It is probable that it is an independent river, and not connected with the Quorra. The *Cross River*, which falls into the estuary, as it may be termed, 60 miles from the sea, has been ascended by the same gentlemen; and as it comes from the N.W., it may be part of the Niger, or Quorra, and forming, as it were, a part of the delta of that river. The particulars of the ascent of these rivers will be found in the "Geographical Journal," vol. vii., page 195, and vol. xi., page 189; and in the same work, vol. xiii. (1843), page 197, it states that Mr. Becroft has "ascended the *Old Calabar River* about 300 miles;" which will confirm the above supposition that it is an independent river.

The SEASONS of this country have been described by Lieutenant Bold nearly as follows:—Although nature here is apparently in a ceaseless state of verdant vegetation, the seasons vary as sensibly as in more temperate regions, contributing to the decay of old and regeneration of new fruits and plants. The spring commences about November, and the hot months of summer continue until May, during which period the weather is clear and fine, but excessively hot, with occasional tornadoes. From the middle of June the rains gradually increase, and continue in all July and August, descending during the latter in torrents. This period may be considered as the winter, and during it the inhabitants are afflicted with colds, fluxes, fevers, &c. In September, October, and November, the country is entirely enveloped in exhalations, which the natives term the *Smokes*, and which are exceedingly injurious to the European constitution. In this season fumigations of tobacco through the vessel, with smoking, have been found efficacious in repelling the pernicious effects of the vapour.

It is advisable for those who intend to remain for a season in the river to have a housing over the vessel, in order to preserve the health of the crew, as well as the ship's decks and sides, which will otherwise be materially damaged by exposure to the sun during so long a period.—(*See also the remarks of Captain Midgley,*.)

The chief commodities are palm oil, ivory, pod pepper, and red wood. The palm nut arrives at its maturity toward the latter end of February, or beginning of March; sooner or later, as the weather may have been favourable or otherwise. This, consequently, regulates the season for trade; and the natives, it is to be added, are frequently occupied at the plantations until near the end of April, when the palm oil trade commences.*

RIO DEL REY, &c.—The RIO DEL REY, or KING'S RIVER, is separated from the Calabar by the peninsula called Backasey, which, on its southern part, is 4 leagues broad. From the East head the land trends S.E. by S., 1½ leagues, to *Backasey Gap*, and thence E.S.E. [*nearly East*], 2½ leagues, to a bluff and rocky point called

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* There are two kinds of palm oil from the lowland countries of equatorial Africa. The first is of a thick or butterlike consistency, in colour a paleish yellow, but often of very inferior quality. It is brought from the table lands of Ebo in canoes belonging to the native traders of Brass, Bonny, New and Old Callebar, &c. The second variety is always recognised by its greater fluidity and rich golden tint; its specific gravity predominates over the former, and, therefore, is less liable to adulteration. It is chiefly produced in the Camaroons River, and in the Subo districts of Benin River, and is highly appreciated by the oil merchants of Europe.—*Dr. W. F. Daniell.*

Backasey Point, at the entrance of the river, and from which a reef stretches 2 miles to the eastward. A broad mud bank surrounds all the southern coast, as already described, and continues 9 or 10 leagues up on the western side of Del Rey River.

Those bound to this place may be directed by the high lands to the eastward and N E. Toward the East, between the parallels of 4° and 4° 24′ N., are the elevated MOUNTAINS OF CAMAROENS, or *Camaroons*,* the highest peak of which, in lat. 4° 13′ N., long. 9° 12′ E., is 12,357 feet in height above the sea. To the northward of the Camaroens are the RUMBY MOUNTAINS, 9 leagues in extent from North to South, and the highest peak of which is in lat. 4° 57′ N., long. 9° 18′ E. An insulated mountain, called the QUA MOUNTAIN, stands at 7 leagues to the N.W. of the Rumby Mountains, the summit of which is in lat. 5° 15′, long. 8° 51′ E. In clear weather the summit of the Camaroons may be seen at a great distance, and although so near the Equator, frequently capped with snow.

On the Survey, 16*th April*, 1826.—"*Quitted Old Calabar* for *Rio del Rey*, a distance of 12 miles, passing *Backasey Gap*, a creek communicating with the Calabar, but through which there is no passage for vessels of any burthen. This was examined by Mr. Rogier, who had the command of two boats for the purpose. Upon entering, he landed at *Fishtown*, a village from which all the inhabitants fled with the utmost precipitation, leaving everything they possessed, even to their arms. The huts resemble those in general use along the coast; but one custom peculiar to this people is in the disposal of their dead, whose bodies, instead of being interred, were placed under an open shed, on a slightly elevated platform, with a bowl of rice or other grain near the head.

"*The Rio del Rey* is generally represented in the charts as of considerable magnitude, which is, in fact, the impression it naturally conveys on being approached; but that which is taken for the river is in reality but an open shallow bay, with several creeks branching from it, and one larger than the rest, 4½ miles wide at its entrance, but rapidly decreasing into a narrow channel. The bay is formed on the eastern side by the lofty Camaroons Mountains. The shores are thickly-peopled; the inhabitants appear to live principally upon fish; as we saw from 40 to 50 canoes every morning depositing the produce of their nightly labours on the beach. The villages are large, and, unlike those to the southward, are built on the skirts of the bay, and exposed to view from the water. This feeling of security is produced by vessels seldom seeking slaves in the river; but still these people are a timid race, and we had great difficulty in holding any intercourse with them. They would frequently come off in their canoes full of men, and a chief seated in each; but, when near the vessel, they would suddenly turn round and paddle to the land in the greatest consternation."—*Owen*, vol. ii., p. 361.

With the Peak of Camaroons S.E. ¾ E., that of the Rumby Mountains E.N.E., and that of Qua Mountain, N.E. by N., you will be without the Bar of the Rio del Rey, at 2½ leagues to the S.S.W. of Backasey Point. The channel thence rounds to the N.E. into the river, and the coast eastward forms a bay, 4 leagues in breadth, filled by alluvion from several rivers, and over which the water is very shoal; for even in the channel to the river the depths are only 2, 2½, and 3 fathoms, muddy bottom. This river seems to be no longer a place of trade; yet it is said that Rumby, on the East, abounds in an excellent species of ebony, which may be had cheap, as well as provisions of all sorts, hogs, goats, yams, &c., provided you are well guarded against the natives.

"This river (Rio del Rey)," says the Old English Pilot, "affords abundance of large elephants' teeth, which they commonly barter for copper bars, counterfeit coral, beads, knives, &c.

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* The name of Camaroons is derived from the Portuguese Camarao, or shrimps, of which there is great abundance in all the creeks and rivers in the Bight.

"The country, far and near, is all low and marshy ground, affording little or no fresh water.

"Here a European must look for himself; for the inhabitants are so subtilly mischievous, that you will be betrayed before you are aware; and they are so barbarously cruel, that the parents sell their children, the husband his wife, one brother and sister the other; and, in decency and order, are scarcely a degree above the beasts."

This description was written in the seventeenth century, and we do not find that the inhabitants have improved since that time.

CAMAROONS MOUNTAINS.—There are few spots on the earth's surface where more of grace and grandeur, of beauty and sublimity, are found blended in one noble panorama than at the equatorial approach on the West coast of Africa. The voyager's eye, fatigued by the low, flat, melancholy shores of Benin and Upper Biafra, rests with inexhaustible delight upon a "Gate," compared with which Bab el Mandeb and the Pillars of Hercules are indeed tame. To his right towers Santa Isabel, the Peak of Fernando Po, marked in the chart as 10,700 feet above sea-level; on his left is a geographical feature more stupendous still, where the Camaroons Mountain, whose height is popularly laid down at 13,760 feet, seems to spring from the wave, and to cast its shadow half-way across the narrow intervening channel, whose minimum breadth does not exceed nineteen miles. They are evidently sister formations, these giant pyramids; they wear a family look; their shoulders, clad in flowing garments of evergreen vegetation, converge gradually, and almost continuously, at an angle of about 12°, till they meet at a neck upon which a superimposed conical head denotes the great central spiracle.* In the island, however, superior humidity prolongs the woody region, whilst the continental mountain, some 3,000 feet more elevated, shows a greater expanse of grassy surface clear of high trees. Remarkable also is the variety of the scene, which is rarely beheld under the same aspect.†

According to Captain Allen, the native name for the highest part of the Camaroons' or Camaroons Mountain is Mongo ma Lobah; but at the back, or inland, it is called Makoli ma Pako. The isolated peak near the Bay of Amboises, about 5,000 feet high, is Mongo m'Etindeh. Although at a distance this noble mountain appears to rise by a continuous slope from the sea, on a closer view it is found to consist of a succession of hills, with intervening valleys of the richest soil, covered to within a third of the summit by beautiful forest trees, which are also seen fringing the ravines still nearer the summit. The remainder is clothed with grass, which becomes more scanty, as the colour, which approaches the reddish brown of volcanic ashes near the cone, sufficiently indicates. The volcanic origin of the whole of this district is strongly marked by the scoriæ and numerous streams of lava which have reached the sea. From the present condition of its surface, it must have been for ages in a condition of repose; though there is reason to think it sometimes betrays its latent fires.

In clear weather, says Captain Owen, the stupendous highland scenery of the *Camaroons Mountains* gradually become unfolded to our view. The base of these mountains occupies a space of nearly 20 miles in diameter, the highest peak being 13,760 feet above the level of the sea, covered with verdure and trees of luxuriant growth nearly to the summit; but one bare brown ridge, running from the eastern side toward the sea, at a short distance appears like lava. The Peak of Camaroons stands so boldly above the surrounding pinnacles, that the descent seems unbroken, giving to

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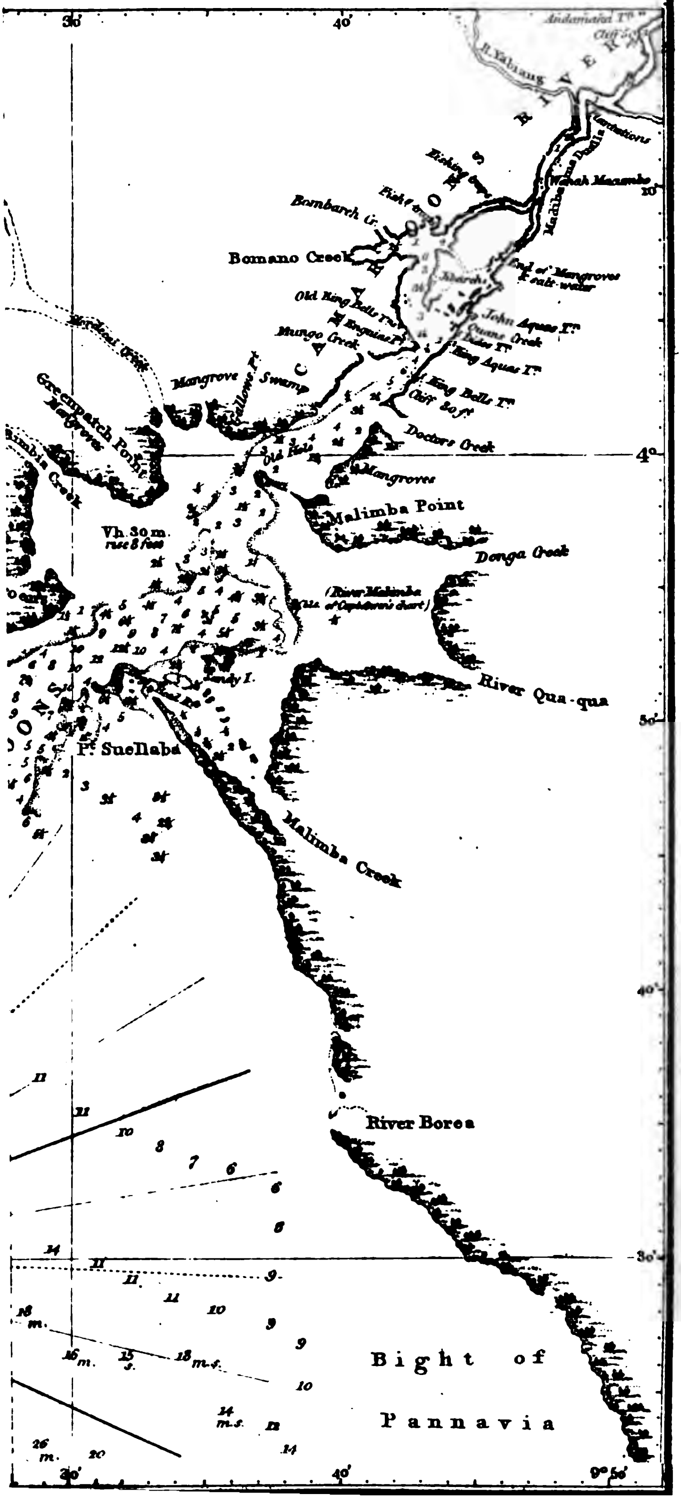
* Smaller volcanoes like Vesuvius "change almost imperceptibly from the steepest incline at which the outermost ashes and rocks will hang together, to a curve which ultimately sweeps away into a horizontal direction." But in those the cone bears a far greater proportion to the whole than in such features as the Camaroons and Fernando Po, consequently the angle of the culminating line appears excessive.

† Abeokuta and the Camaroons Mountains, an Exploration by Richard F. Burton, F.R.G.S., 1863, vol. ii., pp. 25, 26.

RNANDO PO.


30'
40'
Andamaiad Tn.
Cliff 50 ft
R. Yabiang
CAMEROONS RIVER
Plantations
Fishing town
Fish town
Wahah Macambo
Madiba ma Dudla
Bombarch Cr.
Bomano Creek
End of Mangroves & salt-water
Jibarch
Old King Bells Tn.
M. Enguine Tn.
John Aquas Tn.
Quans Creek
Mungo Creek
Dido Tn.
King Aquas Tn.
King Bells Tn.
Cliff 80 ft.
Mangrove Swamp
Gallows Pt.
Mordecai Creek
Greenpatch Point
Mangroves
Bimbia Creek
Doctors Creek
Old Hole
Mangroves
Malimba Point
Vh. 30 m.
rise 8 feet
Donga Creek
(River Malimba of Capt. Owen's chart)
Sandy I.
River Qua-qua
P. Suellaba
Malimba Creek
River Borea
Bight of
Pannavia
4°
10'
50'
40'
30'
9° 50'

the whole the appearance of one vast mountain rising from a single base. The more distant Rumby Range, on the contrary, was seen towering in rude and rugged masses like the tombstones of a past earthquake; their greatest height must also be considerable, as we perceived them when more than 60 miles distant. The most lofty of these ranges is 44 miles N.E. of the Peak of Camaroons, the intervening space being a plain, with several conical hills rising abruptly from its surface, giving to the scene a novel and extraordinary appearance. *Qua Mountain*, which is situated 64 miles N.W. of Camaroons, is also a stupendous elevation, and was discerned by us from a distance of nearly 80 miles. Most of these are volcanoes, as well as the whole of Fernando Po, which is immediately opposite to this part of the main. The sea boundary of the Camaroons presents some singular evidences in support of this; amongst them may be mentioned two rocky cliffs at some distance apart, but which are connected by means of a gallery perforated at equal distances by a line of holes answering the purpose of windows, resembling the work of an expert engineer in the excavation of a fort.

Captain R. F. Burton, that most indefatigable and accomplished of travellers, when at Fernando Po, in 1861, visited and ascended this noble peak. He then formed a project of forming a sanitarium for these pestilential regions on its lofty slopes.

A sanitarium is sorely wanted for this portion of Africa. During the present year (1861) Lagos has become a British colony, with the usual amount of civil and military establishments. The only escape from the deadly malaria is to Tenerife or Ascension; the former distant, under the most favourable circumstances, three weeks; the latter ten days of steam by the aid of an accidental cruizer. On the other hand, the Camaroons are distant barely fifty-five hours. Its area is little less than the inhabited portion of the Neilgherry Hills in Western India. It has every range of climate—a tierra, *caliente*, *temprada*, *fria*. The negro can flourish in the lower, the white man can sojourn in the upper part, where within 4° of the Line nightly frosts prevail throughout the year, and stores of ice and snow can be collected. The country is scantily inhabited, and only in parts, by a timid and feeble, though a wild and treacherous people. Land may be bought for a nominal sum; and the soil, as this narrative will show, is everywhere fitted for cultivation. With less than the Spaniards have expended upon Fernando Po, or than that which we have lavished on the splendid but useless Zambesi River, these mountains might in a few years be made a solid benefit to the coast of Western Intertropical Africa. I have seen the marvellous effects of removing naval invalids from their ships to a few hundred feet above sea-level at Fernando Po; here, by judicious management, even greater benefits might be expected. And for the future we must provide against another and even a greater evil of climate: the vomito, or yellow fever, which, of late years confined to the lands about the Gambia and Sierra Leone, is, whilst I write, advancing with giant steps towards the Equator. Its extreme elevation is known to be 2,500 feet.*

The second volume of Capt. Burton's narrative contains a very interesting account of his ascent of the great peak, in December, 1861, the first time that ever man had been there, in company with Mr. Saker, the missionary at Victoria, and Mr. Mann, the government botanist. A peak near its lofty summit was named *Isabel Peak*, after Mrs. Burton, and the southern summit of the peak itself was called Mount Albert, and the northern one Victoria Mountain.

Victoria Mountain now proved to be the shell of a huge "double crater," opening to the south-eastward, where a tremendous torrent of fire had broken down the weaker wall. The whole interior and its accessible breach now lay before me, plunging sheer in vertical cliff. The depth of the bowl may be 250 feet; the total diameter of the two, which are separated by a rough partition of lava, 1,000 feet. The interior slope is a highly irregular cliff, which drops horizontally, streaked and ribboned with igneous matter, red and yellow, whose bands of colour indicate horizontal stratification, and comminuted scoriæ standing at an angle of 45°. Not a blade of grass, not a thread of moss breaks the gloom of the Plutonic pit, which is as black as Erebus, except where the fire has painted it red and yellow. To the north-west appeared a ridge overtopping the rest of the two-headed cone which we had called Albert Mountain, and a bluff wall or dyke, which I had not time to visit.

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* Abeokuta, &c., vol. ii., pp. 62—4.

To record my claim I heaped up a small cairn of stones, and in it placed a fragment from the facetious pages of Mr. Punch, perhaps the greatest traveller on record, and certainly one of the traveller's best friends.

In advancing from Backasey Point to the S.E., or toward the high land of Camaroens, you will pass over a slimy, muddy ground, and have 3½, 4, 5, and 6 fathoms, at 4 miles from shore. But on advancing toward the S.W. point, or lat. 4° 6', the water deepens, and the coast becomes bold; and here, at 2 miles from shore, are 10, 12, 14, and 16 fathoms. From the point the coast continues bold for 20 miles, to the point and village of *Bimbia*;* and at a short distance from it the depths are 10 and 12 fathoms.

All the country from the estuary of the *Rio del Rey* to the *River Bimbia*, which is 16 leagues to the S.E., is thickly covered with trees; and southward, from the S.W. point of Camaroens, it is generally bold-to. At 2½ miles to the southward, on the same meridian, is an insulated sunken rock, between which and the coast are 3½ and 4 fathoms. It is also reported to be nearly 3½ miles to S. by W. This rock requires caution, especially in those bound to *Camaroons River*, the mouth of which is 4 leagues more to the eastward, and the intermediate soundings, 3, 3½, 4, 5, and 6 fathoms, the latter depth being in the mouth of the river.

AMBAS BAY, or the *Bay of Amboises.*—This bay, at the southern base of the Camaroons Mountains, contains the new settlement of *Victoria*, founded in 1858.

In May of that year the Spanish Government suddenly resumed possession of Fernando Po, after it had been virtually occupied by the British for nearly half a century. The Spanish Government immediately issued a mandate forbidding any but Roman Catholic schools, and ordering those who preferred any religion which is not Catholic, to confine their worship within their own private houses and families.

This announcement spread dismay among the Baptist converts, about 800 in number, at Clarence Town, and who had been settled here since 1827, and in consequence the Rev. Mr. Saker, the Baptist Missionary, his good wife and family, went over to Ambas Bay, and purchased from the natives about 12 miles of the coast at its head, and founded this settlement of Victoria with many of his flock. His iron-framed house, still standing, was the first erection.† Good water, and abundance of vegetables, yams and pumpkins can be procured here.

The bay was surveyed by Captain William Allen, R,N., in 1842, and the following is his description:—

There are in the Bay of Amboises three small islands, the sizes and capabilities of which are in inverse ratio to their population. The largest, *Mondori*, or *Mondoleh*, only half a mile long, situated at the S.E. part of the bay, is high and rocky, but with a level surface of the richest soil imaginable, of decomposed basalt, and the steep sides are clothed with beautiful wood. There are at present, only ten men with their wives and families on it, though, if well cultivated, it would afford subsistence for probably five times as many. There are three or four springs of water halfway up the side of the island, which, though scanty, are said to be always flowing. The landing is bad, but might be improved.*

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* By the natives called *Esoubou*.

† See Captain Burton's account of this bay, and its relation to his proposed sanitarium on the slopes of the mountain, in his second volume of his "Abeokuta and the Camaroon Mountains," London, 1863.

The outer island, *Ndami*, *Daméh*, or *Ambas*, is smaller, and nearly barren: the rocky slopes and summits only are clothed with a little brushwood and grass. It is, in fact, a narrow ridge of rock, elevated at the outer extremity; but although nature has here provided no means of subsistence, about 300 or 400 people have made it their home. They exchange the abundant produce of the sea with the natives of the main land for plantains and yams. They have also a good stock of goats and pigs, which feed on the precipitous sides of the island. The only place at which boats can land is difficult, on account of the rugged rocks and incessant swell. With very little trouble, however, a good pier might be made. There is only one scanty spring which, indeed, was dry when I saw it, unless I was misled; the inhabitants are, therefore, obliged to catch rain water, and in the dry season they must get supplies from the main land.

The Island *Bobia*, or *Bubya*, called also *Pirate Isle*, from the *supposed* predatory disposition of the natives, is more barren even than Dameh. It is a mere wreck of a larger island, as the numerous isolated fragments, perforated by the sea, and lying in its vicinity, bear witness of its having been formerly much more extensive.

It is probable that it once joined the adjacent perpendicular cliff on the main land, as the structure is similar, and between them there is but a narrow and shallow channel. The promontory may even have extended to Daméh, with which it is in a line. The progress of destruction is still going on, as enormous fragments of rock are lying at the North end of the island, which I believe to have fallen since my visit in 1833. Although this is much smaller than the other two islands, it is swarming with people, almost every available spot on its rugged sides being occupied by a hut. It is perpendicular on all sides, and the only access to the summit is by clambering up what appears to be the projection of a basaltic dyke, a fearful path, passable for only one at a time, and which might be defended by a child. The inhabitants probably owe to their impregnable position the bad character they have among their neighbours. They are a ferocious looking, though a shy race; but I never heard of any well authenticated charge of piracy against them. More correctly speaking, their secure position has probably engendered a spirit of independence, and a determination to resist oppression. The chief of Bimbia complained to me that they would not acknowledge his authority, nor comply with demands which I found were not so just as he alleged. These islanders are the principal fishermen of the bay, which in fine weather they cover with their light canoes. This enables them to barter from the main land, with which they are in constant communication, the scanty clothing they require, and supplies of plantains, yams, &c.

The *anchorage* is excellent in all parts of the bay, as to holding ground and depth; and although it is a lee shore, and there is an incessant swell, I believe it never blows home here so as to endanger ships, and the landing is not so bad as at Ascension. The prevalent wind is S.W., to which the bay is quite open; and the worst months are, I believe, July and August, but there is shelter behind the Island Mondoleh. Wood, vegetables, and live stock may be had in abundance. Excellent water can also be had near *Kieh*, but only at low tide, as the water gushes out at the foot of a rock. By excavating, however, above high water mark, a very convenient watering place might be made. The disadvantage of being on a lee shore is amply compensated by the purity of the sea breeze which blows across the Atlantic. The adjacent main land, too, is nearly devoid of mangroves and swamps; and as the land wind blows over lofty mountains, it is rendered cool and refreshing. Indeed, from the peculiarity of its situation, and from local circumstances, I think that the Bay of Amboises will be found to be the most healthy position on the coast of Africa. Although my visits were during part of the rainy seasen, we seldom had more than a shower, or a tornado, about once in 24 hours. The rest of the day the weather was very beautiful, and we were some days without rain.*

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* Separated from Ndami by a channel one mile and a half broad, stands Mondori, which Captain Allen calls Mondoleh, and others Mondoli, a much more interesting place. About two miles distant from the northern shore, it is separated from the bold headland forming the eastern arm of the bay by a fair broad channel. The Victorians declare that it is accessible whiles the sauciest sea runs outside, and that, when the rest of the bay is a sheet of foam, vessels can ride snugly under the lee of its northern point; they assert that it has an excellent holding bottom of dark tough clay, and that it is superior in many points to the celebrated Clarence Cove, Fernando Po.—*Captain Burton.*

The **RIVER BIMBIA** was formerly called the *Rio Pequeno*, or *Little Camaroons River*. It may be easily known by an islet without the entrance, on the western side, which is about a mile in length frem North to South, and lies at half a mile from the nearest shore. There is anchorage on its N.W. side, in 16 feet of water, opposite a village on the main. The watering place is on the West side of a small cove, at little more than a mile to the N.E. of the anchorage.

At Bimbia there are numerous villages built on a beautiful amphitheatre of rocky ground: the inlet is sheltered by a small island, and would be an excellent anchorage for ships trading in palm oil; but it is very hot, and the land winds blow over the swamps of the estuary. The inhabitants are actively engaged in collecting palm oil. They, as well as the natives of the islands in the bay, are of the Dualla nation; while those of the base of the mountain are of a different race, and are called by their more civilized neighbours "bushmen."

The bar of the River Bimbia, which is 2 miles broad, extends to the S.E. of the islet, and has, on its shoalest part, 13 or 14 feet of water. The water within deepens to 4 and 7 fathoms. From Bimbia, the high land of Camaroens, or Camaroons, appears as beneath when the summit is 6 leagues distant:

After leaving the Camaroens, the *Barracouta* proceeded round to the Bimbia, where she was visited by two canoes, one of which was capable of holding above 50 people, but had not then more than 33, who presented a singular appearance from the swiftness with which they plied their paddles, and the exact time they kept, resembling more a piece of mechanism than the united efforts of man. These canoes should never be allowed to approach a merchant vessel when not well prepared for an attack, as two instances of their successful treachery are on record, in one of which they plundered and destroyed an English sloop, together with her crew; and in another, where they contented themselves by taking everything that was valuable, and ill-treating the men. They also attempted to cut out an English brig; but the master, Mr. Town, being aware of their intention, quickly obliged them to retreat, with the loss of four killed.

The chiefs, or, as they term themselves, "gentlemen," who visited the *Barracouta* in their canoes, were distinguishable at some distance by the elevated chair on which they sat, with an umbrella borne over their heads. They had mistaken the sloop for a merchant vessel, and were much chagrined when they found themselves in error.

From the River Bimbia to the extremity of Cape Camaroons, the coast forms a convex sweep of 11 miles. It is all low, and covered with trees. *Point Suellaba*, the South point of the entrance of Camaroons River, is of the same description. The bearing and distance of the two points from each other are S. by E. ¾ E., and N. by W. ¾ W. [*S.E.* ½ *S.* and *N.W.* ½ *N.*], 7 miles; but shoal grounds extend from the South halfway over the entrance, and the channel in is toward the northern shore.

CAMAROONS RIVER.—The fine estuary of the Camaroons is the common receptacle of several streams. It owes its name to the Portuguese, who called the extreme point Cape Camaroons, from the vast quantities of small shrimps (*camarao*) found there. This name has been extended to the principal river which falls into it;

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* Journal of the Royal Geographical Society, vol. xiii., p. 16.

but the natives, as is usually the case, give it the name of the countries through which it flows. Thus, at Bell's Town it is called *Madiba ma Dualla*. Higher up it is *Madiba ma Wuri*, &c. Although it is a beautiful river, it is not to be compared with the Niger. Its average breadth above the mangroves is about 400 yards, as far as Captain Allen reached. In the dry season this portion of the river varies in depth from 2 to 20 feet, though they had rarely more than 8 feet; but when flooded, there would be water enough for vessels of any draught. From the accounts, however, of several intelligent natives, the navigation is obstructed by rocks at Banem, about 50 miles from the furthest point which was reached, or 90 miles from the sea; but beyond these rocks the river goes on for many days, according to the pilot, though he could give no further account of it.

"It has been supposed," continues Captain Allen, "that, besides the Cameroens, a large river fell into the estuary, called the Malimba; but all persons agreed in telling me that this is but a divergent creek from the Qua Qua River, which comes from the eastward. My pilot, Glasgow, said that this river has more mangroves, but that it is of less magnitude than the Wuri or Dualla (the Camaroens). It is also obstructed by rocks, at about the same distance from the sea. He said the king of all the Qua Qua country resides at a place about 80 miles up the river, called Longassi.

"In the months of May and June, 1842, while waiting with H.M. steam vessels *Wilberforce* and *Soudan* under my command, I took advantage of the delay to examine this part of the coast of Africa. I directed my attention first to the large estuary of the Camaroens. It had been partly surveyed by Captain Vidal; but some large rivers, which were supposed to discharge their waters into it, particularly the Malimba, remained unexplored.

"By carefully feeling our way with the lead, we arrived safely at the anchorage of the palm oil ships, in one of the rivers which has retained the name of the Camaroens. Here a considerable trade has been carried on for many years with a tribe of the natives who have settled on the lowest *diluvial* part of the left bank of the river, where, by their activity in collecting palm oil, and their intercourse with Europeans, they have become a very large and important community, possessing such a degree of civilization as to render them, in my opinion, highly interesting, and to prepare them for becoming a connecting link between the civilized European and the less advanced natives of the interior.

"These native settlers are, at present, subject to two chiefs, or principal traders, who have assumed a regal style and title. The towns of King Bell and King Aqua, separated only by a little brook, are of great extent inland. The houses are neatly built of bamboo, in wide and regular streets; but the number of plantain and cocoanut trees, and even of large fields of maize interspersed among the houses, render it impossible to form an estimate of the size and population of the towns. I had no time to walk over them; and no credit can be attached to the extravagant estimates of the natives. They are, indeed, an assemblage of villages, or *towns*, as they call them; each named after the head of a family, who selects a spot of ground, and adds to his own in proportion as he increases the number of his wives and slaves. The settlements are situated on a plain, which, being elevated 50 feet above the level of the river, and being of a sandy nature, may be considered as comparatively healthy; an inference corroborated by the appearance of the natives, and the accounts of Mr. Lilley, agent to Messrs. Hamilton and Jackson, who has resided there nearly ten years.

"Notwithstanding the constant intercourse kept up with the tribes of the interior, who bring down palm oil in their canoes, the nature and even the names of the rivers which furnish the means of transport for this valuable article have hitherto remained unknown. I endeavoured to obtain information from the chiefs and most intelligent men, but found their accounts so vague and unsatisfactory, that I was resolved on penetrating as far as I could without risking, what was of paramount importance, the health of my crew."

Accordingly Captain Allen, on May 7th, 1842, proceeded in a galley to explore the river, having found that it would be hazardous to take the *Wilberforce*, on account of the shoal parts of the river. Having advanced to beyond the salt water, the aspect of the banks began to change; the mangrove giving place to the first trees, which, as on the Lower Niger, were low palms with immense arching leaves or branches (called, erroneously, bamboo), from which the natives extract the best palm wine, called Nimba. On leaving the narrow channel, and passing the upper end of the Jibareh Creek, they attained the principal object of their little voyage, the main undivided river, a broad and magnificent stream, resembling some of the reaches of the Niger, below Aboh, and about 400 or 500 yards wide. Soon large huts were seen on the banks, the property of domestic slaves belonging to Bell, or Aqua. There were spacious clearings around the huts, cultivated with bananas, plantains, cocoa, &c., all denoting plenty; and the cleanliness of the houses and the platforms in front far surpassed the miserable hovels of the lean and dirty "gentlemen" on the lower parts of the Niger. As they advanced, villages became numerous, and all had a comfortable appearance, being built in the neat style of the Camaroens towns. As most of the principal natives were in the habit of trading with the ships, they frequently recognized Mr. Lilley, and the inquiries they made dispelled the idea that they were going among an uncivilized people.

They proceeded to about 40 miles from the sea, when they were deterred from advancing from fear of the effects of the fogs and vapours of the river. "The object I had in view was attained, viz., to ascertain the nature and magnitude of the river, by reaching the main undivided trunk, which is only 8 miles above Bell's Town, and less than 20 from the sea. Indeed, the real left bank of the river comes down as far as that settlement, which is an elevation of 50 feet above the river."*

According to Captain Owen's chart, from the inner extremity of Cape Camaroens, Greenpatch Point, on the East side of Bimbia Creek, bears N.E. by E. ½ E., 4½ miles; Malimba Point, on the North side of Malimba River, E. ½ S., 9½ miles; and the South Point of Malimba River, S.E. by E., 9½ miles. On entering, give the Camaroens land a berth of half a league, and you will sail through the best water into the estuary of the two rivers, with Malimba Point nearly East, until a sandy islet, bearing S.S.W. ¼ W., and Point Suellaba are in one, where you will have 4 and 5 fathoms of water in the stream of the two rivers, at 2 miles below a long spit of sand extending from Malimba Point, and 1½ leagues below that Point.

From this roadstead the inner point of Camaroens will bear W.N.W. ¾ W. 5 miles; Greenpatch Point, between Bimbia Creek and Mordecai Creek, N. by W. ¾ W.; Gallows Point, on the North side of Camaroens River, N.N.E. ½ E.; and Malimba Point nearly East.

From hence you may proceed up Camaroens River, by bringing the rugged trees on the East of Gallows Point to bear E.N.E., and run directly for them, which will lead over flats of 2¼ fathoms, forming the bar of the Camaroens River. You run directly for these trees, until over the flats, which you will know by deepening your water to 3¼ and 3½ fathoms, in what is called *Old Hole.*

Enguias Point is 8 miles up the river beyond Gallows Point; and 3 miles below it, on the same side, is *Mungo Creek.* By bringing Enguias Point about two ships' lengths without the bushes at the water's edge, below Mungo Creek, you clear the middle grounds of the river, and advance within a musket shot of the North shore, at the rugged trees near Gallows Point.

Proceeding upward, about 2 miles above the rugged trees, steer more for mid-channel, keeping the gap up the river about a sail's breadth open; then you may run up to the road off King George's Town, on the South shore, only giving Doctor's Point (3 miles below it) a good berth. Here yon may anchor in 5 fathoms. The tide, on the full and change, flows in the road at 6^h; at the cape, at 5^h 30^m. The rise is 8 or 9 feet.

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* "Excursion up the River Camaroons and to the Bay of Amboises, by Capt. W. Allen, R.N."—Journal of the Royal Geographical Society, 1843, p. 1.

Here it may be observed, that a spit or flat of sand extends from every point of the river in the direction of the ebb tide, and more especially on the South side of the entrance, where the spit from Suellaba Point extends 4 miles to the northward: upon this spit is a chain of heavy breakers, called the *Dogs' Heads*, which may be seen at a great distance, and require a good berth, as the tide sets over them with rapidity.

Palm oil and ivory are equally abundant in this neighbourhood, especially the latter, which is large, and of very superior quality. To three large towns, *Mungo*, *Batimba*, and *Belimba*, the ivory of Camaroens is brought from the interior; and these, therefore, are the principal depots whence the river is supplied. The system of barter is the bar trade, every article being valued at so many iron bars. Salt is an essential and important article of commerce, being in great demand.—*For other particulars, see Lieut. Bold's Volume*, p. 84.

We subjoin a communication (June, 1838) from Captain Midgley, relative to this river:—

The directions hitherto given for the Camaroens River not being much calculated to assist a stranger, I send you the following, which were *partly* written by Captain John Lilley, of this town (Liverpool), with some corrections of my own. Captain Lilley's long experience and knowledge of the Camaroens River (having resided there some years) will, I think, entitle his directions to much confidence. I distinguish Captain Lilley's directions by inverted commas.

"From a berth of 1 league off the N.E. end of Fernando Po, if there be no current, steer E.S.E. ½ E. by compass, keeping Bimbia Point a little on the larboard bow, until the low and level land that extends from it to the S.E. is distinctly seen from the deck. When two-thirds of the distance across, which will be in about 8 or 9 fathoms of water, keep the lead going, and do not approach this low land nearer than in 5½ fathoms" (to avoid the Bimbia Flats), "until the S.E. extremity of it, which is the *False Cape Camaroens*, bears N.E. by E. by compass, when a vessel must steer directly for it. The False Cape is 11 or 12 miles to the S.E. from Bimbia, and is the first part of the land of the river that should appear to a vessel coming from the westward. The False Cape may be seen about 4 leagues off in clear weather; and in steering toward it, upon a N.E. by E. bearing, there should never be less than 4½ and 5 fathoms of water, over a soft bottom, until nearly approaching the cape. When the vessel is about half a league from False Cape, steer along the land into the mouth of the river, in about 5 fathoms of water; taking care not to go into less than 4½, nor to more than 8 fathoms, until Cape Camaroens, which forms the western point of Bimbia Creek, is abeam of the vessel (bearing about N. by W.); whence steer toward Malimba Point, on about an E. by S course, until Greenpatch Point (on the East side of Bimbia Creek) bears North, when you may safely anchor upon a muddy bottom, in 5 fathoms water, and send up a boat to Camaroens Town for a pilot.

"*Greenpatch* is a round point, sloping gradually toward the water's edge at high water, and has low, smooth, verdant bushes upon it, from which the point derives its name.

"*On sailing from the False Cape to the Greenpatch*, should the lead give less than 4½ fathoms, haul well to the southward immediately, as there are several hard and shallow banks on the North side, which must be carefully avoided. (The North end of Fernando Po, kept well open of the False Cape, may be a good mark for avoiding them, but this mark I merely mention as an object for future investigation.) By keeping in the above depth of water, that is, in from 5 to 8 fathoms, a vessel will be out of all danger from the *Dog's Head Reefs*, which extend nearly two-thirds of the distance across the mouth of the river, from Point Suellaba, and are always seen and heard at a great distance. The Dogs' Heads are steep, having 14 fathoms very close to, and 10 fathoms within, at the distance of half a mile from them. On standing toward them, from the northward, the depth increases very rapidly from 9 fathoms; and they are extremely dangerous, as the ebb tide out of the Camaroons, Malimba, and Qua Qua Rivers, and also out of Bimbia and Mordecai Creeks, which are branches of Bimbia River, combine together, and the stream rushes directly over them, with great velocity, at spring tides.

"As the bottom of the channel into the Camaroons River is all soft mud, should hard bottom be found the vessel will be out of the fairway; and the depths from sea up to Greenpatch should never be less than 4½ nor more than 8 fathoms, to ensure the safety of the vessel from the Dogs' Heads; and there should not be more than 6 fathoms until the true Cape Camaroons bears N.N.E. or N. by E. The False Cape must not be brought to the northward of N.E. by E. until the vessel is about half a league from it, as before stated; and with light winds frequent bearings should be taken, should the tides of flood or ebb have effect upon the vessel.

"It may not be superfluous to remark, that too much attention cannot be paid to the lead and lines when in or near this river, as the water shoalens and deepens in some places very suddenly, particularly between Cape Camaroons and the Dogs' Heads, or about S. by W. from that cape.

"In case a vessel is obliged to anchor off Cape Camaroons, she will find much less tide and easier riding in 5 or 6 fathoms than she would in deeper water.

"An instance having occurred of a vessel's boat going up the *Makimba River* (where there is no trade) instead of the Camaroons, it may be advisable, in sending from Greenpatch for a pilot, that the boat should keep the North shore aboard until she gets 6 or 7 miles above Mordecai Creek (which is the second creek or bight on the North side of the river, and of which Green patch forms the western point); then haul over to the South side of the river; and the vessels will be seen, if there are any in the river, at King Bell's Town, about 3 miles above Doctor's Creek, on the South side of the river, and about 15 or 16 miles above Greenpatch.

"From the anchorage at Greenpatch the Camaroons River does not appear to run up the country, but rather looms like a bay, with low land and detached tall trees at the bottom of it; and a stranger may be easily deceived if he does not take the above precaution of keeping on the North side of the river.

"At Greenpatch the tide flows at 5^h 30^m, full and change, and rises above 8 feet. The water at Camaroons Town is fresh and fit for use, if filled from between half ebb and low water.

"Dysentery and intermittent fever are very prevalent diseases in this river, but their severity may be much alleviated by keeping the vessel as dry as possible. The worst effects have resulted from the unnecessary and very pernicious practice of washing decks at night, in this as well as other African rivers. In all the rivers of Africa, but particularly in the Camaroons, ships should have a considerable stock of *quinine*.

"Vessels intended for Camaroons should be well provided with good ground tackling, and be well manned and armed; for the tides are uncommonly strong, and the natives are of a very warlike and turbulent disposition, and universally dishonest in all their dealings. Their kings or chiefs have no power over them; and in chicanery, low cunning, and treachery, they far surpass any other people on the coast of Africa."

The intermediate coast southward between the Camaroons and Corisco Bay, during five days' sail, appeared at a distance like one continued range of low banks, thickly covered with wood, and with only a few small creeks to break off the connection. It appeared to be well inhabited; but the villages are so buried amidst the trees, that it is with difficulty they can be discovered. Many canoes came off, as the *Barracouta* ran along, bringing quantities of fish, fruit, vegetables, &c.; and although the ship was going about 6 knots an hour, yet they contrived to keep up with it for a considerable distance. These canoes are not more than 12 feet in length, by about 2 in width, and are built sufficiently light to allow a person to take one on his back when no longer required upon the water. The natives are extremely dexterous in their management; and although using but one paddle, propel them with great velocity. When they wish to lessen their speed, they throw a leg out on each side, and stop almost immediately.

BIGHT of PANNAVIA.—From Point Suellaba, or the South point of Malimba River, the coast trends 16 miles S. ¼ E. [*S.S.E.*] to the mouth of the *River Borea;* and from the mouth of Borea to the bottom of the Bight of Pannavia, 38 miles S. by E. [*S.S.E.* ¾ *E.*] All the shore is low, and covered with trees. In the run you may descry the River Borea; but it has a bar, passable in boats only. Many forests of palm trees cover the high land. The soundings, at a league from shore, are generally 5 and 5½ fathoms. In the bottom of the Bight you can safely anchor, near the shore, in 4 or 5 fathoms, muddy ground. In the bottom of the Bight, in its S.E. part, is an excellent watering-place.

From *Point Garajam*, at the South end of Pannavia Bight, the coast assumes another direction, trending to the Rio Campo S.S.W. ¼ W. [*S.* ¾ *W.*] 13 leagues. It continues low, and covered with trees, except within 3 or 4 leagues of the point, where it rises into naked hills.

Batanga.—The country South of the Bight of Pannavia is called the Batanga territory, but Mr. Consul Hutchinson says:—There are two Batanga territories. Little Batanga, the most northern and western, is, with a river of that name, included within the greater part of the territory enclosed within the Bight of Pannavia. Big Batanga comprises the territory on the West extending from Cape Garajam to the River Campo, a distance of about 40 miles. Both of these districts are inhabited by the Bapooka and Banaka tribes. Batanga yields about 40 tons of ivory a year, and viewed from the sea the cataract of the Lobei River has an extremely picturesque aspect, falling in three different streams.*

Great Batonga Bay, lat. 2° 52′ N., 8 miles southward of Cape Garajam, is a mere roadstead. It was visited by Capt. R. F. Burton in September, 1862, in H.M.S. *Bloodhound.* The *Bloodhound* 1½ mile off the land, in 5 fathoms water, lat. 2° 52′ N., and long. 90° 52′ E. At times a heavy surf breaks upon the whole of the lee shore, from Camaroons River to Corisco Island; the landing is execrable, and many lives and canoes are lost. There is, however, no difficulty in making Batonga Bay. At some distance, say 10 miles, it appears as a large headland, bounded North and South by the sea, and the small cascade of the Eloke, or Great Batonga River, offers a conspicuous land-mark. When nearer, four tall cotton trees (*Bombax*), looking like gigantic palms, decorate the site of the sheds, representing the only European factories—those of Messrs. Laughland and Messrs. Burford and Townsend. The aspect of the coast is by no means unpleasant. The country known to us by the names of Batonga or Banoko—properly the names of important tribes—begins at the South shore of the innermost recess of the Bight of Biafra, and extends southward to Cape St. John; in this direction, the limit of the Consulate of Biafra. It is a long band of densely-wooded lowland, based upon a yellow line of sand, broken in places, which appear to be the mouths of small rivers. Here and there fields of a lighter green give evidence of plantations; and the clusters of brown huts prove it to be not deficient in population.

The Elephant Mountain,, about 7 miles inland, was ascended by Capt. Burton, who found its elevation to have been correctly given as 1707 feet.

The most remarkable of these hills is the *Elephant Mountain,* which is clearly distinguishable from the roadstead, bearing south-east, and distant apparently 10 miles. Curious to say, there is a similar formation on the East African coast, with no great difference of latitude. At a distance the resemblance to an elephant *couchant* is striking. When the clouds clear away, a long chine extends high above the lowlands; sundry depressions form the ear and neck; a swelling on the right of the profile, dipping towards the southern base, is the trunk; and the body everywhere bristles with trees. At this season it is rarely well seen. I need hardly say that it has never been ascended by Europeans, some of whom have resided for years without exploring a mile of the interior.*

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* Hutchinson's Ten Years' Wanderings among the Ethiopians, 1861, p. 224. A view of the falls is given on the title page.

The Banaka or **Banoko** people occupy a district 25 miles in length halfway between the Camaroons River and Corisco Bay. It is only of late years that they have descended from the interior mountains, but they are now the most noted canoemen on the whole coast, using a singularly light and small canoe, not more than 8 or 10 lbs. in weight, as well as a larger one for more distant voyages.—(*Rev. J. L. Wilson.*)

These villages were first noticed by M. Bouet-Willaumez, the French Governor of Senegal, who despatched Lieutenant de Kerhallet to examine them. The subject of his report is as follows:—At 3 miles North of the Rio Campo there is a point, remarkable only by two hillocks standing opposite each other. Still further North are two more sandy bays, the rocky points which divide them having the sea washing their bases. At the head of these points begins the roadstead or Bay of Banoko. This bay is not deep, and is easily known by the high lands around it. One of these mountains, named *Alouette Mount*, is 1,041 feet high, and slopes gently towards the North. The trees at its foot are on the shore, and are high. It is bluff to the South, nearly vertical, and joining the first line of heights from the shore. When off-shore, especially making it from the South, two other round mountains appear far off in the interior; on a nearer approach they sink behind the nearer hills. Another mark is *Mount Nisus*, very far inland, lying East and West with Mount Alouette. It slopes gently to the South, but is nearly perpendicular to the North, and in some positions a sugarloaf mountain is seen near it.

The four or five villages of *Banoko*, which give name to the bay, are not seen, even from the anchorage. In coming to this bay, bring the Alouette Mount to bear E.S.E. and approach as near as the breeze will allow you, and anchor in 5 or 6 fathoms. The villages are extensive, and have sank in the production of ivory.

The River Campo is known by two mountains to the northward of it, several leagues inland, and named, after their shape, *Saddle Hill* and *Table Hill;* the latter is the southernmost. On the South point of the river lies a shallow stone bank, that appears at low water, and on which the sea breaks with great violence. According to the French officers, there is a whitish islet off the coast in lat. 2° 10′, which is a good landmark for this port. At 4 miles beyond it is a small bay (Bata).

Four leagues and a half from the River Campo lies the small Bight or Cove of *Bata*, wherein there is good anchoring ground in 6, 5, and 4 fathoms; as also good ballast and fresh water. A few houses, close to the water side, are scattered along the shore, which is very low and woody, and its strand is seen at low water. From hence you descry the Seven Hills, lying in a row from *N.N.E* to *S.S.W. true*, about six leagues inland. The middle one, a sharp peak, is the highest (2,786 feet); and they have nothing remarkable but their ill shape.

River St. Benito (properly St. Bento) lies 16 leagues S.W. ½ S. [*S. by W. ¾ W.*] from the River Campo. It has 3 or 4 fathoms in the entrance, which is narrow, and 4 miles within it. The North point is remarkable by a great hill, called the *Heybern.* The South point, about 2 miles from it, is steep-to; and a reef extends along the coast, with some rocks above and under water, to the inward of the river. This coast is all covered with trees; nor are you free from it when in 18 and 20 fathoms of water. At 4 or 5 miles up, the river divides into two branches, to the E.N.E. and E.S.E.; and on these a very extensive trade for ivory was formerly carried on.

CAPE ST. JOHN, or *Minge Point*, in lat. 1° 9′ 40″ N., long. 9° 21′ 35″ E., is 10 leagues S.W. ¾ W. [*S.W. by S.*] from the River St. Bento. The coast between is irregular, rocky, and foul. At about 8 leagues inland, between these places, is a mountain, 3,940 feet high, which, from its form, is known by the name of *Mitre Hill.* To the southward of the River St. Bento, one-half of the coast is low and woody; the other half, ending at Cape St. John, is rocky. The cape itself, surrounded with a ridge of rocks, has no beach: and 2 or 3 miles off its pitch lies a small stony bank, with 7 or 8 fathoms of water on it. The streams, meeting here with impetuosity, caused by the great unevenness of the ground, the water, which comes from the South, beats violently against the cape, and then runs swiftly along to the northward.

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* For an account of this ascent see Journal Royal Geographical Society, vol. xxxiii, pp. 241—250.

On a track survey of this coast, in the pinnace of the *Barracouta*, the country appeared beautifully picturesque, presenting a most pleasing diversity of hill and vale; but the natives gave demonstrations of determined hostility, and it was found prudent not to allow them to approach in any numbers, and also at night to lie at a convenient and safe distance from the land.

From Cape St. John the coast trends S. by E. ½ E. [*S.E.* ¾ *S.*] 1½ league, to the N.W. point ef Corisco Bay; and it forms two slender sandy coves, divided by a rocky headland, toward which are regular soundings.

Interior to Ninje, or St. John's Point, and abutting into Carisco Bay, is another point, called *Malenga*, between these two points, is a small river running from the base of Mitre Hill, There is here a line of quartz rock, exactly like that containing gold at the Australian diggings.—(*Hutchinson.*)

A *dangerous sunken rock* lies a mile off shore, at 2¼ miles N.W. from Malanga Point.

CORISCO BAY, between the N.W. point above mentioned, and *Cape Esterias*, to the South, presents an extent of 10 leagues. Nearly midway is the isle called *Corisco* (or Thunderbolt) *Island*, the N.W. point of which is 14¼ miles S.S.W. ½ W. [*S.* ¾ *W.*] from Cape St. John.

Only two of the islands in the Bay, Corisco and Big Elobey, are inhabited. The population of Corisco does not exceed one thousand. For many years an American mission, sent out by the Presbyterian Board of Foreign Missions, has been established here, whose chief, the Rev. James L. Mackay, has reduced their language to writing, and translated into it much of the gospel. The natives of Corisco are artificers of very large boats which they scoop in canoe fashion out of the single trunk of a tree.*

Even in this luxuriant land Corisco is distinguished by its beauty. It is a little world in miniature, with its miniature forests, miniature prairies, miniature mountains, miniature lakes, and miniature precipices on sea-shore.†

Corisco is claimed by the Spaniards, and is a part of the territory attached to Fernando Po.

The North part of the Bay forms a semicircle, 12 miles in breadth, into the N.E. side of which falls a river, the *Mooney*, from the N.E. The entrance of this river is a mile in breadth; and off it, at the distance of 5 miles, are two islets, called *Elobey Isles* (formerly *Mosquito*), having several rocks and shoals about them to the North and N.E. From the N.W. point of Corisco Bay these islets bear S.S.E. [*S.E.* ¼ *S.*] 10½ miles; and from the N.W. end of Corisco Island, E. ¼ S. [*E.N.E.* ½ *E.*] 4 leagues.

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* The island is not more than twelve miles in circumference. Its population, of about 1,000 souls, is scattered all over the island. They are a quiet, peaceable people, hospitable to strangers and fond of white men, particularly of the missionaries who have settled among them. They belong to the Mbenga tribe, who are the most enterprising traders and the most daring boatmen of the coast. They were formerly the most warlike tribe of this part of the country, and, when I first came on the coast, were continually fighting with their neighbours. About ten years ago the Presbyterian Board of Missions sent out some missionaries, and the labours of these worthy gentlemen have almost entirely changed the character of the Mbenga. They are no longer so quarrelsome, and have lost that reputation for ferocity on which they formerly prided themselves.

† "Savage Africa," by W. Winwoode Reade, Esq., F.R.G.S., an interesting work, containing much information as to the native tribes, &c.

From the River Mooney the eastern coast of Corisco Bay trends nearly true South, 7 leagues, to the mouth of a larger river, the *Moondah,* which is 5 miles in breadth. The water along shore, between the two rivers, is shoal to the distance, in some parts, of 3 miles from shore. The general depths at the entrance of the Moondah are from 3 to 5 fathoms. From the western point of the Moondah to Cape Esterias the coast trends W. N. [*W.S.W.* ½ *W.*] 4 leagues.

The N.W. point of Corisco Island lies in lat. 0° 55′ 54″ N., long. 9° 19′ 45″ E. This isle is rather more than 3 miles in length from North to South, and 2 miles in breadth. At a mile from its S.W. side is an islet named *Laval,* with a reef about it. From its S.E. end a narrow reef extends 2 miles to the eastward; and there is a shelf extending from the northern shore, The island is low, but overgrown with high trees, which seem to stand in the water. The tide flows here, on the full and change, at 5ʰ; the rise is 7 feet. Variation of the compass, in 1838, 20° W.

At 5 miles S. by E. ¾ E. [*S.S.E.*] from the S.W. point of Corisco lies an islet, called *Baynya,* or *Little Corisco,* having several shoals, &c., about it; and a flat extends 1½ leagues from it to the S.W. In the channel between the latter and Cape Esterias the depths are 5 and 6 fathoms; but shoal water extends halfway over from the southern shore.

The River Mooney was formerly described under the name of *Rio da Angra,* or *St. John's River.* From the N.W. point of Corisco Bay its entrance bears S.E. ¼ E. [*E.S.E.*] 13 miles. In the direct course between, the depths are from 6 to 5, 4½ to 3 fathoms; but more to the South are several shoal spots of 2 and 2½ fathoms. From the same N.W. point, the entrance of the River Moondah bears S. ¼ E. [*S.S.E.*] 28 miles. The least depth on the Bar of the Mooney, at some distance without the River, is 13 feet. Within and without it is all soft ground, and variable but increasing depths *

The natives of the Mooney were reported as being unfriendly, and particularly inimical to Europeans; and as the inhabitants of all the islands gave them the same character, and will not even allow them to land, it may not be without foundation. Whilst the *Barracouta* was employed about these islands, the natives were continually coming on board; they were found very docile, and passably honest; a fortunate circumstance, as they supplied the vessel plentifully with every description of fresh stock and vegetables.

The River Moondah, which falls into the S.E. angle of Corisco Cay, is rather a salt water estuary, receiving the waters of several minor rivers, one or two of which are of importance. Its entrance between *Arandah Point,* on the West, and the East coast is about 5 miles wide. At 4 miles above Arandah Point is a small island, *Assimba,* which will become clear of the land as soon as you are well within Arandah Point. Soon afterwards you will make out the village of *Nembo,* opposite to Assimba, 3½ miles East of it, and remarkable by two large trees, with white trunks.

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* The MOONEY is said to have been much frequented by the Portuguese for ivory, ebony, bar wood, and pod pepper, obtainable at a moderate rate, for common cloths, iron-ware, tobacco, rum, beads, &c. By coming to an anchor off Corisco, a ship may load with bar wood in a few days: but to procure ivory, it is requisite to proceed to the town, about 3 leagues up the river, on the North shore; taking every precaution against treachery on the part of the natives. Off the town is anchorage in 5 fathoms, sand and gravel. The river has been described as navigable 3 or 4 leagues farther up to the N.E., and then contracting into a very narrow channel.

Assimba belongs to the Gaboon people, and large vessels can come up to it. The passage thither is somewhat difficult, on account of large mud and rocky banks which extend from Arandah Point, and also contract the river. This island, the northernmost of a line, lies in the mouth of the *N'cogwé River*, up which Lieutenant Sewal ascended in the small French steamer *Pionnier*, in February, 1862, and found that it led to a portage of about 400 yards, over which the boats are drawn to the shores of the Gaboon at Kringer, North of the French settlement.

The other streams are the *Anambo*, to the southward, and the *Cohi* from the S.E. This was ascended by the French vessel *l'Ardbe*, in 1861. The River *Djiemboé*, also from the S.E., was explored in the steamer *Pionnier*, by Lieutenant Sewal, in 1862, for 20 miles from its entrance. These streams, also, run close to others which enter the Gaboon.

Corisco Bay is described as follows, in the Narrative of the Expedition under Capt. Owen:—This place derives its name from the Portuguese, being imparted from the constant thunderstorms by which it is visited. The Bay is 32 miles, North and South, from Cape St. John to Cape Esterias, and 15 from the islets which are situated off the entrance of the River Moondah. The surrounding shores are thickly clothed with verdure; the numerous islets with which it is studded being also green to the water's edge.

The people here, particularly the females, are a very degraded race: but in 1826, shortly after the arrival of the *Barracouta* off Great Corisco (the principal island), Jack Romando, a kinsman of their King Jem, and who in his early years had visited England, went on board, and produced various certificates highly creditable to his honesty and humanity. The inhabitants of the isles greatly resemble those of the Gaboon, a little to the southward, in manners and dress; but, strange to say, their language is totally different.*

The towns situated on Cape St. John are under the dominion of the king of Corisco, but the other places around the Bay are inhabited by *Bullamen*; a very wild and savage, but timid race.

The *Corisco Islands* are very fertile in appearance, and productive in reality; the largest, called *Great Corisco*, being about 3 miles long, by 2½ broad. At the South end is a populous town, with a good anchorage, at 1¼ mile from shore, in 7 fathoms of water. There are, however, several patches of rock in the neighbourhood, which being slightly covered above, and surrounded by very deep water, renders them extremely dangerous, making it requisite for vessels to take every precaution when in their vicinity.

RIVER GABOON.—The River Gaboon or Gabon has been surveyed under the orders of M. le Comte Bouet Willaumez, by Lieutenant Fleuriot de Langle, in 1844. This French officer has made an elaborate report on the hydrography of the river, or rather estuary. But there is one point which demands notice—that the names which have been applied in former years have been replaced by other and recent French names, in addition to applying similar appellations to points not previously named, which may cause some confusion in the nomenclature.

The Gaboon was colonized by the French, on August 25th, 1843. Possession was taken by Captain Monléon, in the brig *le Zébre*, accompanied by the gun boat *l'Eglantine*.

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* Captain Vidal has said that, along the West coast of Africa, those natives who speak English are in the habit of using a number of words and phrases, often so strangely misapplied as to create much amusement. Among the most remarkable are, "bob," for noise or threats; as "Suppose I tief dat man wife, bob come my side;—"lib," or "live," for remain, or to express locality; as "Ship lib here two moons;" "Rock lib here;"—"chop," for eating; as "Suppose you go long way among Bullaman, he chop (eat) you;" &c. All officers under the rank of captain they term "mates."

It is called *N'Pongo* by the natives, and is rather a broad estuary than a river. It penetrates the coast for 30 miles, with a breadth of 7 miles opposite *Coniquet*, or *Konikey Island*, 12 miles from its mouth.

At its head the two principal streams fall into it. The one from the East is the *Como*, or *Oulombo-Empolo*, which rises in the Sierra da Cristal in the interior, and is about 800 or 900 yards wide at its mouth, and can be readily ascended for 50 miles or more. It was explored in 1858—60 by Messieurs Dusmesuil and Braouezec, two young French officers. The other river is the *Rhamboé*, which has a course of about 40 miles from the S.E.

There is a communication from the River Moondah to the Gaboon by the River *Cohit*, which enters the latter opposite Konikey Island.

The French establishment is about 12 miles from the entrance of the Gaboon on its N.E. side, and consist of two stone buildings, one for the commandant and his officers, the other for an hospital. Numerous wooden barracoons serve as warehouses, and other buildings serve for a community of nuns, and a Catholic mission, with a bishop at its head. A block house, now abandoned, stands near the village of St. Louis.

Magnificent forests surround the river, containing a large quantity of noble timber and dye woods.

Since November 1st, 1854, the French establishments here and on the Gold Coast, Assinee, and Grand Bassam, have been separated from the Government of Sénégal, and the Gaboon is now the centre of the administration, and a military force (212 officers and men), and a naval force (9 ships, of 960 horse power, and 793 men), are maintained here.*

The Gaboon derives its principal interest to the world at large, from the travels and adventures of M. P. B. Du Chaillu, who for several years resided with his father at the French settlement, the latter having a factory there. M. Du Chaillu's book, "Adventures on Equatorial Africa," in which he describes, for the first time, the habits, &c., of the gorilla, is one of the most interesting works in our language. It excited some controversy, but this was quite subverted by the intrepid traveller's second journey and narrative, "A Journey to Ashango Land," 1867, a sterling work of as great interest as his first.

At a few miles above the French Compton, and opposite to Pongara Point, is *Baraka*. It is thus described by M. Du Chaillu.†

Baraka is the head station of the American Board of Foreign Missions on the Gaboon River, and, indeed, the only mission the board has as yet on the Western Coast. It was established in 1842 by the Rev. J. L. Wilson.

Baraka is a Mpongwe word, derived from *barracoon*, a slave factory or inclosure. Strangely enough, the very site whence now the Gospel is taught to these benighted Africans, and where their children are instructed in the knowledge and duties of Christianity and civilized life—this very place was once, and not many years ago, the site of a slave factory, where the cruel slave-trade was carried on with much energy and sucsess.

Baraka is situated at the summit of a beautiful hill, distant a few hundred yards from the shore, and about eight miles above the river's mouth. The native villages surround the base of the hill, and are scattered along the river bank, and are thus easily accessible to the missionaries, who visit them at all times, and preach to the natives several times a week.

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* Revue Maritime et Coloniale, tome 7.

† An excellent description of the mode of carrying on the trade here, as well as of the natives in general, is given in M. Du Chaillu's Equatorial Africa, Chapter ii.

The missionary grounds are spacious, and are surrounded with a noble hedge of fragrant lime-trees. The buildings are mostly of bamboo—which is the best building material on this part of the coast—and consist of two dwellings occupied by the missionary families; the church building, which has some fine shade-trees in front; the storehouse, the schoolhouse, a little building containing the missionary library, houses where the children attached to the mission are lodged; and, finally, the kitchen—kitchens being in the tropics necessarily separate from the dwellings—and the other necessary offices, among which figure fowl-houses, &c. Behind the houses is a fine orchard, containing various fruit-trees, all planted by the missionaries, as were also the fine cocoanut, mango, and other- trees which are scattered about the premises, and beneath whose grateful shade the houses are built.

M. Bouet-Willaumez speaks in high terms of the Gaboon; having passed entire months there without having to deal with the maladies so common in the Bonny. The vegetation he describes as magnificent, only to be compared to that of Guyana; wood of all kinds, for building, dyeing, ebony, &c. Ivory is also a great feature in the trade; cotton and other tropical products will doubtless form features in the future commerce.

In 1843, as before stated, M. Bouet-Willaumez, as governor of the Senegal, was charged by the French Government to found on the right bank of the Gaboon an establishment for the trade, and for the refitting and refreshment of the ships employed in the French cruising squadron on the Coast of Guinea. The primitive establishment, called *Fort Aumale*, was then constructed, and is the basis of the French possessions here, which have been gained by treaty or purchase from the natives at different periods.

Contiguous to Fort d'Aumale a very pretty garden was laid out by M. Bouet but it is deteriorating, There is also a pretty little Père la Chaise cemetery; and the bishop has a considerable quantity of land under cultivation. There is a breakwater at the pier, which is very useful. About half a dozen French merchants have stores in the neighbourhood of the Compton. There is a restaurant kept by a French widow; and the establishments of the English merchants, four in number, are located higher up, in the neighbourhood of Glass Town.*

The peninsula which separates the Gaboon from the River Moondah has been named *Louis Philippe Peninsula.* It is bold, and on the highest hill, 650 feet, which has been named *Mount Bouet*, there is an enormous tree. These characteristics form a good landmark, at about 12 miles distance in approaching from seaward. The southern side of the entrance is called *Marie Amelie Peninsula*, and is low and flat; the distinction between the two sides of the river making an important difference in the landfall.

In the subsequent descriptions we have retained those names which have been applied in former times, and are those according with our English Admiralty Survey.

Cape Esterias, before noticed, lies, according to Captain Vidal, in lat. 0° 37′ 48″ N., long. 9° 21′ E. The shore about it is rocky and foul. From the Cape to *Point Sta. Clara*, or *Joinville*, at the entrance of the River Gaboon, the coast trends S. by W. ¼ W. [*S.* ½ *E.*] 7 miles. It is, in general, bold, and covered with trees; but about Point Sta. Clara (Joinville) are several sunken rocks. At half a league from shore are 7, 6, and 5 fathoms. Point Clara is in lat. 0° 30½′ N., long. 9° 20½′.

From Point Clara, *Pongara*, or *Sandy Point* (or *Cape Montagniés*), on the South side of the River, bears S. ¾ W. [*S. by E.*] 8 miles. Here the sea is constantly bubbling and agitated, in consequence of the shoalness of the water and the bottom being very foul. At 4 miles S.W. by W. ½ W. [*S.W.* ¼ *S.*] from Pongara Point is *Gombé*, or *Round Corner Point*, distinguished on each side by elevated land, which serves as marks for the River. Within 3 miles of Sandy Point, to the N.W., are several shoal spots, which render an approach on that side unsafe.

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* Hutchinson's Ten Years Wanderings, p. 253.

A trading town, called *King Qua Ben's Town*, stands on the eastern shore, facing the sea, at S. by E. ¾ E. [*S.E.* ½ *E.*] 3 leagues from Point Sta. Clara; and another town, *King Glass Town*, stands on the same side, at 3¼ miles S. by E. ½ E. [*S.E.* ¾ *S.*] from Qua Ben's Town. From King Glass Town to *Owendo*, or *Red Point*, the coast trends S. by E. [*S.S.E.* ¾ *E.*] 6½ miles. Here the River forms a great bight to the eastward, which has not yet been surveyed. At 2 miles to the S.E. of Red Point is a small island, called *Dambee*, or *Coniquet* (or *Konikey*); and at 3½ miles to the S.W. of this is a smaller, called *Embenee*, or *Parrot Island*. Between these, in the channel, are 6 and 7 fathoms of water. Between Red Point and Parrot Island are 6 and 5 fathoms.

The entrance between Cape Sta. Clara, on the North, and Pongara (or Sandy) Point, on the South, is 8 miles wide; but several shoals which require great caution lie in this space.

On Pongara Point a *beacon* was erected in 1864, consisting of the funnel of a steamboat painted white, and this stands out on the sand as a white tower. At 4½ miles N.W. from this beacon is the *Mouche Bank*, the outermost danger on the South side, having 9 feet least water. It is nearly connected with Pongara Point by shoals.

At 3¼ miles North from the beacon is the *Caraibe Bank*, 9 feet, marked on its South side by a large cask with a pole and ball. Between this shoal and Cape Sta. Clara is the *Nisus Bank*, and the Recherche Bank. At 2 miles E.S.E. of it is the *Middle Bank*, 15 feet; and at 4 miles S.E. from the Caraibe Bank buoy is another buoy on the South edge of the South-east bank, at 2¼ miles East of the beacon on Pongara Point, the channel, called the *Belle Paule*, or *Penelope Pass*, lying between. It has from 7 to 12 fathoms water.

At 2 miles within Pongara Point, on the West side of the estuary, is the coal depot.

Having first made Cape Clara, which is bold and conspicuous, steer for Pongara Point, avoiding Mouche Bank; approaching Pongara Point the funnel mentioned above will be readily distinguished, standing out on the sand as a *white* tower. The mark for taking this channel is to bring the South point of Coniquet (or Konikey) Island open of Oweenda Point, bearing S.E. ¾ E. When the beacon is seen, the cask with pole, on the Caraibe Bank, and the buoy on the S.E. bank will be recognised, both which are to be left on the port hand on entering: having passed the latter *buoy* there are no more dangers, and you may steer for the anchorage, bearing in mind that the strength and direction of the current is considerable at full and change of the moon.

"Captain Vidal gives Round Corner, near the southern point of this river, in lat. 0° 18′ 5″ N., long. 9° 20′ E. On anchoring, he was visited by *Tom Qua Ben*, brother to King Qua Ben, whose capital is an extensive town. Tom Qua Ben was dressed in the laced coat of a mail coach guard, and from his well-favoured and portly appearance did credit to the character. Being the first on board, he was extremely solicitous to be chosen captain's 'tradesman,' producing certificates of the fidelity with which he had acted in that capacity for various masters of merchant vessels which had visited the place.

"These 'tradesmen,' as they term themselves, are generally the principal inhabitant, who are intrusted by the masters of vessels with goods, in order to purchase such articles in return from the *Bullamen*, or natives of the interior, as they require. A man or woman is always delivered up, as an hostage for their honesty.

"The natives of Gaboon are a fine looking race of negroes: they nearly all speak English with fluency, and generally understand it. But here, as elsewhere, fetishes, carried on the person, are generally worn as protections against poison and violent deaths; and it would appear that they are subsidiary to the resident fetishe, one of whom is supposed to exist in every town. The ordinary cruelties and superstitious observances of the country also prevail here.

"The trade of the River has consisted, principally, in slaves and ivory; the former on a great scale, with the French, Spaniards, and Portuguese; the latter with the English. Camwood was also in great demand during the late war, for army clothing; but since the peace this trade has almost ceased.

"These people, like all savages, are difficult to trade with, postponing the conclusion of their bargains until the patience of those with whom they deal is exhausted; and, when the agreement is made, they commence endless persecution for a dash, or present, *to make friend*. Should the article they part with be valuable, they will take assorted goods only in exchange. Thus, for two large tusks taken on board the merchant brig in the river, weighing together 130 pounds, the native to whom they belonged received the following articles:—four muskets, two neptunes (large brass pans), two iron kettles, four pieces of cloth, assorted fish-hooks, earthenware beads, copper bars, one jar of rum.—*Owen*, Vol. II., p. 320.

WINDS ON THE COAST.—Along this part of the African coast, from June to October, the winds vary much from S.S.W. to S.S.E. in the twenty-four hours; which renders it advisable for vessels beating to the southward to tack accordingly, and take every advantage of a slant; also to stand in for the shore after midnight, for the benefit of the land wind, which sets in toward the early part of the morning. The current most commonly runs to the northward, about 18 miles in the twenty-four hours, but sometimes varying to the southward with the change of the moon.

RIVER GABOON TO CAPE LOPEZ.—From Round Corner to Cape Lopez the coast forms a bay, 22 leagues in extent, between the two points, and presents land more generally elevated than that to the northward, with white downs, covered with trees. At the bottom of the bay the land breaks, and forms several rivers eastward of Cape Lopez, the chief of which is the River of Nazareth.

The coast is all clean and safe from Round Corner to a little isle near the coast, named *Fanaes Islet*, which bears from Round Corner S.S.W. ½ W. (*S.* ¾ *W.*) 13 leagues. From this islet the mouth of the River Nazareth bears S.W. by W. ¼ W. (*S.W.* ¾ *S.*) 16 miles, being on the same parallel as the extremity of Cape Lopez, or lat. 0° 36′ S. On the West point of the mouth of the Nazareth River is a little town called *Fetishe Town*, upon a low sandy point. Cape Lopez bears from this town W.N.W. (*W.* ½ *N.*) 17½ miles, in lat. 0° 36′ S., long. 8° 40′. All the coast eastward of Cape Lopez is low and sandy, covered with trees and bushes, and shoals extend from it to the distance of 5 or 6 miles out to sea.

The River Nazareth is 6 miles wide at its entrance, but is very difficult to make out, from the low and drowned land it flows through. The whole of the coast is but the delta of the Ogobai or Ogo-wai River.

The OGOBAI or OGO-WAI RIVER seems to be one of the principal rivers of Africa, though it may not have the magnitude or the celebrity of the Niger or Nile. It was first ascended by Lieut. Lerval, of the French ship *Pionnier*, in a boat, in July and August, 1862. It is formed by the junction of two large rivers, at about 60 leagues from its mouth, the *N'Gounyai River*, coming from the southward of East, and the *Okanda*, which comes from the N.E. or North, from beyond a chain of mountains seen in those directions, and flows around the basins of the Gaboon and Moondah,—perhaps from the neighbourhood of Lake Tshod. Lieut. Lerval visited the sacred lake *Eliva Jonanga* at above 100 miles from the Bay of Nazare, and below this the river maintains a breadth of at least 2,700 yards, with a very rapid current and immense volume of water throughout the dry season, and which is constantly fresh, even at high water. Its entrances about Cape Lopez are impracticable, and its commerce finds its way to the Gaboon.*

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* See the Révue Maritime et Coloniale, tome ix., Paris, 1863, pp. 66, 296, &c.

Its delta has formed the projection of Cape Lopez, whose singular conformation is probably owing to the junction of the two opposing currents, the South African coming northward along the coast, and the Guinea current from the westward, which meet hereabout, and thus neutralize each other.

The *River Nazaré*, or the Nazareth, is one of the mouths of the Ogo-wai. It has but very little depth in the dry season, and runs into the head of the bay of the same name. The land is all exceedingly low, covered with mangroves, and nearly uninhabited.

CAPE LOPEZ was originally called by the Portuguese the Cape of *Lopo Gonsalvez*: but it is improperly termed the Cape, being a drowned land, which, at first sight, appears all rugged, and with bushes that seem to stand in the water. It is steep on the sea side, free from flats and reefs, and may be approached as near as convenient. The inner coast trends to the S.S.E. 4 leagues, and thence forms a river, the South end of which falls into the sea, on the West, at 7 leagues to the southward from the point or cape; thus, in fact, forming an island.

From the inner part of Cape Lopez a spit of 12 to 18 ft. extends to the N E. about 5 miles. In the bay within this are from 20 to 14 and 9 fathoms. Here also is anchorage, in 8 or 10 fathoms, bringing your small bower to seaward, almost in 12 fathoms; but in the months of June, July, August, September, and October, you need not moor the ship, as the wind blows always from the South.

When you come from the northward to Cape Lopez, you must take great care to avoid the N.E. spit above mentioned, as it cannot be perceived until you are very near it; for, at about 1¼ league from the N.E. side of the cape, you may have 10 or 12 fathoms at one cast, and the next find yourself aground.

In this place there is plenty of fish, but no mutton or beef. The negroes are very officious, and for the smallest trifle will supply you with water, wood, and fish.

When you are sailing from the River Bento or Cape St. John to Cape Lopez, always observe which way the *trovado* drives the water; and should you lie at anchor when it arises, you must weigh immediately, and get off; if it be in the morning, with a S.W. or South wind, keep to seaward till noon, then stand again toward the shore with a sea wind; but if the wind does not alter at noon, tack about for all that, and go to the shore, there to anchor in oozy, and sometimes sandy ground.

In the narrative of Captain Owen's Expedition it is said Cape Lopez is in lat. 0° 36′ 2″ S., long. 8° 40′ 4″ E. It is covered with trees, but is low and swampy, as is also the neighbouring country. The extensive bay formed by this cape is 14 miles in depth, and has several small rivers and creeks running into it, some of which, to the southward, apparently communicate with extensive lagoons. On the left point of the largest and northernmost of these rivers is situate *King Passol's Town*, the only assemblage of huts in the Bay. The buildings resemble English cottages. The king's residence was at the back of the town, and rendered conspicuous by the difference in its construction and superior magnitude.

Captain Vidal visited the king, who understood both French and English, and requested permission for the inhabitants to bring off refreshments for the ship's company, which he, with a compliment, readily acceded to.—*Owen*, Vol. II., p. 301.

The following is a more particular description :—

"The next place we made was *Cape Lopez*, which we hauled round (from the southward), and then came-to, it being nearly dark. At daylight the following morning, sent boats away surveying and to cut wood; they met with many herds of buffaloes, but very wild and shy. Some of the party brought on board various specimens of beautiful shells, which had been picked up on the beach; fish and turtle were also found very abundantly at this part of the bay. During the night there was a storm, accompanied with the most vivid and terrific thunder and lightning.

"In standing across the bay next morning, at about 5¼ miles from the cape, met with a very dangerous shoal, extending nearly 2 leagues N.E. from *Prince's Point*, within the cape, some parts of which can be distinguished by a ripple: between this and the cape the water is deep, with a muddy bottom. When we hauled round this shoal we observed a brig at anchor, and shortly afterwards a small schooner. As we continued beating up to the head of the bay against a strong tide, all the boats were despatched to survey. I took the pinnace, and went on the eastern coast, but a heavy rain prevented my making much progress. We passed several hippopotami, considerably larger than those we had generally seen to the southward.

"In the course of the next day we were enabled, with the assistance of a fresh breeze, to complete nearly 13 miles of coast. This side of the bay is one continued mangrove, with the exception of about three-quarters of a mile, consisting of a sandy beach. These pestilential mangroves bear the most feverish-looking aspect it is possible to conceive, and are the general boundary of all rivers upon this part of the coast. Their being composed entirely of mud prevents the possibility of any landing being effected in the neighbourhood, and they are the resort of every disgusting and venomous insect and reptile. The effluvium from them, when the burning sun has been upon them for a few hours, is of the most revolting nature, being an exhalation from all the filth which has accumulated for centuries in the river, and here undergoes the gradual process of decomposition. Toward sunset we anchored for the night off the town called *Fetishe Town*, situated just by the before mentioned small sandy beach. * * * *

"Paid a visit to the king, who resides in a part of the town walled in for his seraglio and household, and who possesses several chairs of European manufacture, which he holds in great estimation. They had been given to him, as a kind of bonus, previous to commencing traffic, by the masters of slave and other traders, from his having established the law that 'no captain of any vessel shall make trade until he has paid an introductory or retaining fee.'" This despot maintains a sway over a very large territory, which produces a great quanty of ivory, tortoise-shell, and every description of tropical fruit. The town is situated on the right or West side of the entrance of the *River Nazareth*, and contains about 300 houses, neatly built of cane. The inhabitants are all armed with either a spear or a musket, which latter they obtain from the traders, and much value. Buffaloes are very numerous in the neighbourhood, together with elephants, lions, tigers, and other wild beasts; while the bay abounds with plenty of fish, and its shores with birds of beautiful plumage. The monkeys here are considered by the people as fetishe, or sacred.

"On the following morning Captain Vidal went on shore to visit the king; upon his return we made sail, and stood across the Bay toward Cape Lopez. The wood is very thick near this cape; but the trees mostly deciduous, from the sampy soil in which they grow. A party was sent brooming, and another to cut wood, for which this place is particularly convenient. Various beautiful shells were picked up by several of the people employed on shore, and a large alligator was seen."

Having completed the survey of Port Lopez, and made some necessary repairs, the *Barracouta* proceeded to the northward. The coast for a considerable distance from the cape is extremely fertile, but apparently has not many inhabitants; only two small villages were observed along-shore for many miles. On approaching Sandy Point, at the mouth of the Gaboon, the country became very low, and thickly wooded to the water's edge; the interior rising gradually to rich fertile hills.

THE ISLANDS OF THE BIGHT OF BIAFRA.

FERNANDO PO.

This island is 34½ miles in extent from N. to S., between the parallels of 3° 12½′ and 3° 47′ N. Its medium breadth is about 17 miles, between the meridians of 8° 22′ and 8° 55′ E. It is very high, commonly covered with clouds, and in clear weather may be descried at the distance of 25 leagues. It is situated 19 miles from the main land, the channel between being strikingly picturesque, having the lofty Camaroon Mountains on one side, and those of the island on the other; the distance between the two highest peaks being about 50 miles, but their bases approaching to within 20. Clarence Peak, rising near the centre of the island, 10,190 feet above the level of the sea, is covered with vegetation to its summit. This Peak is visible, on a clear day, in coming from the westward, for nearly 100 miles; but at times, in hazy weather, with a northerly wind, it may not be seen until within about 3 miles from the shore.

"All the islands of the bight are doubtless of volcanic origin, as well as the high land of the coast in the neighbourhood of Fernando Po. It is perhaps somewhat curious, that all these islands and the Rumby Hills should be nearly in the usual direction of the wind, or about N. 33° E., and S. 33° W. The edge of a parallel rule placed on the chart will very nearly cover Anno Bon, St. Thomas's, Prince's, Fernando Po, and the Rumby and Camaroon Mountains. The volcanic influence appears to have been in one direction."—*Captain Midgley.*

In the ensuing description of this important island we have availed ourselves of the works of numerous authors; in addition to those of Capt. Kelly (1821), Capt. W. F. Owen (1827), Capt. Vidal (1836), Capt. Fishbourne (1841), we have taken some details from the more recent observations of Lieut. Fleuriot de Langle, of the French Marine (1844); also of C. Ph. de Kerhallet, of the same service (1852); of an excellent account of the island given by the late Dr. W. F. Daniell, in his "Sketches of the Medical Topography of Western Africa" (1849). Added to these are various accounts by Capt. R. F. Burton, who resided here as Consul, and from the works of Mr. Consul Hutchinson.

The island of Fernando Po was discovered towards the close of the fifteenth century, in the reign of Alphonso V., by a Portuguese noble named Fernao do Poo, who, from the remarkable grandeur and luxuriance of its wooded declivities, gave it the name of Ilha Formosa, or the Beautiful Isle. The Spaniards, to whom it now belongs, in virtue of an article of the treaty of March 24, 1778, by which this island was changed for that of Trinidad on the Brasilian coast, changed its name to that of its discoverer, Fernao do Poo, translated to Fernando Po, to distinguish it from other islands bearing its original name. The new possessors attempted to found a settlement by building a fort on the East side, in Melville Bay, but they soon abandoned the design, and it remained in the undisturbed possession of the indigenous trides till 1827. On account of the enormous sacrifice of life at Sierra Leone, the British Government resolved, with the consent of that of Spain, to occupy one of the many lowland spots as a station for the refitment of the naval division employed in the suppression of the slave trade. Capt. W. F. W. Owen was despatched in the *Eden* to survey a suitable spot; and in October, 1827, this vessel arrived with the nucleus of a colony from Sierra Leone, which was then established in Maidstone Bay on Point William, the name of Clarence being bestowed on it in honour of His late Majesty William IV. From the progressive influx of settlers, the new town eventually increased in magnitude and population, and soon became sufficiently flourishing under the judicious control of Colonel Nicholls, the previous commandant of Ascension. In the course of a few years, either from the jealousy and misrepresentations from the adjacent African settlements, who dreaded the transference of the official courts of business to their rising rival, or from the jealousy of the Spanish Cortes, the evacuation of the island was determined on. Dr. Daniell states it to have arisen from the former cause; and the exaggerated statements made of its unhealthiness caused a transitory visit to Clarence from the admiral of the station, who in a condemnatory report caused its abandonment. The West African Company purchased the military buildings, &c., and appointed the well-known Mr. Becroft their superintendent. The town still continued to improve, but unfortunately Mr. Becroft was recalled, and several agents successively filled his post, with but little benefit to the settlement. In October, 1842, the West African Company sold their rights and privileges to the Baptist Missionary Society, who transmitted a body of white and coloured teachers. Finally, in 1843, a Spanish man-of-war entered the harbour of Clarence, and on February 27 hoisted her colours, and resumed the dominion of the island on behalf of the crown of Spain, reinstating Mr. Becroft as sole governor and commandant.[*]

Although the Spaniards had assumed the sovereignty they did not take possession of the island until suddenly on one day in May, 1858, a war steamer, the *Vasco Nunez de Balboa*, Commander Don Carlos Chacon, appeared and declared his governorship, and proclaimed the Roman Catholic religion as the only one to be tolerated, except in private. This fell like a bomb-shell among the inhabitants of Clarence, who had been so long settled under their Baptist teachers. These, as before stated, soon after left and settled themselves at Victoria, in Ambas Bay, at the foot of the Camaroon Mountain.

Rapidly succeeding the proclamation came the change of name of the chief town Clarence to Sta. Isabel, and Spanish titles to all the streets were posted up at all corners. A hospital was erected near Point William.

A more effective establishment, with 150 soldiers, executive officers, &c., came out in August, 1859, and a Royal decree of 39 articles was promulgated for the regulation of the colony, which includes Anno Bon, Corisco, and other dependancies.[†]

The aborigines of Fernando Po are designated *Adeeyah's* (accented on the last syllable), but they are better known under the term "Boobie," a word which signifies in their native language "stranger," and seems to have been applied by them to Europeans, from their friendly salutations of *Cow-way*, *Boobie* (How do you do, stranger?), when meeting together. These inhabitants, in development of form, possess several physical traits that contribute to sever them from those nations populating the alluvial lowlands of the Delta. Traces, however, of that structural affinity, which embodies the majority of the negro races into one family, are equally perceptible, although less prominently marked, in those organic points which more closely ally the multitudinous tribes in this part of Western Africa. In corporeal mould these people are well and firmly made, of a pliant and muscular rotundity, in in stature slightly above the average negro standard (those of Camaroons excepted), and, from their active and regular mode of life, are of a vigorous and hard constitution. Obesity of figure, so much esteemed by their neighbours of the opposite coast as one of the perfections of a manly organization, and so ardently coveted by the females as the *ne plus ultra* of their beauty, is not appreciated among them in the same favourable light. A moderate fulness of contour, with a disposition to a compact wiriness of the trunk and limbs, may be said to constitute their physical exterior. The cranium, in its outline, partakes of the usual negro conformation, with compressed lateral parietes, retiring forehead, and woolly hair. The face, though somewhat disfigured by their national tokens, viz., three or four large cicatrized incisions, extending obliquely from the zygomatic arch to the angle of the mouth, is somewhat prepossessing, and, in many instances, resembles those of Europeans. The features, from their attenuation and regularity, are less heavy and unmeaning, while the chin and lower facial outline partially lose that harsh, angular prolongation so predominate in African communities and elsewhere. Their skin, of a brownish black, is frequently daubed over with a yellow ochre, and red clayey pigment, the latter of which they likewise incorporate with their hair in transverse bands and long pendent jets. With the exception of a few tufts of dried gass suspended over the pubic region, both sexes are publicly seen in a complete state of nudity; most of them being decorated with broken shells, the vertebræ of snakes, and other rude ornaments of savage life. The inhabitants of this isle, from their secluded and scattered villages, are rarely seen in sufficient numbers to furnish any statistical information; and it is, therefore, from the absence of these necessary details, difficult to arrive at any precise conclusion in respect to the total population. They have been computed, at different periods, to vary from 7,000 to 10,000. Within the last few years there has been a progressive increase, and their numbers now would fall very little short of 12,000. They are not amenable to any fixed government, being subdivided into a series of petty tribes, each of which is placed under the jurisdiction of its own independent chief, *Kekkerakoo*, whose power, though unrestrained, is not so arbitrary as the monarchical despotisers of the continental chiefs.

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[*] Medical Topography, &c., of West Africa, by W. F. Daniell, M.D., F.R.G.S., 1849, pp. 140—143; and Manuel de la Navigation a la Cote Occidentale d'Afrique, par Capt. C. Ph. de Kerhallet, tome iii., pp. 4, 5.

[†] Article 28 declares "The duties of five per cent. for importation, and two and a half for exportation, will be continued. Anchorage duties of 25 reals for vessels above 20 tons and less than 50; of 50 reals for those of 50 and less than 350; and of 100 reals for those that guage from 350 to above 700 tons above the last guaging. Vessels under 20 tons are free of anchorage."

Article 29. All bonded goods or merchandise are free of duties for importation or exportation, but will pay one per cent. for storehouse expenses.

"The Boobies are a quiet, inoffensive, and unassuming race, tolerably shrewd and intelligent, very kind and affable to white visitors, and fully as warlike and turbulent among themselves, as evinced by their frequent fierce intestine wars. Differing in several respects, not only in languages, manners, and mode of life, from other African nations situated near them, they are still, however, tinctured with their superstitious fears and prejudices, adhering, but in a milder degree, to their barbarous laws and and debasing customs.

"The Boobie towns are chiefly built on the denuded crests of the midland slopes, and generally consist of from fifteen to twenty habitations, which may be considered as mere sheds. Adjoining them are enclosures for the preservation of sheep, poultry, goats, &c., of which they rear moderate quantities for sale. Surrounding these villages are plantations of yams, cassada, palm and plantain trees, and other clearances set apart for future cultivation. Of late years, the requisitions of homeward-bound vessels have enhanced the value of stock and other provisions; and from the supply being inadequate to meet the pressing demands, the prices have consequently much advanced." *—*Dr. Daniell.*

CLIMATE.—This is a subject of the greatest importance, and yet it is one on which very opposite opinions have been expressed. Mr. Bayle, colonial surgeon of Sierra Leone (who, however, never visited or saw the island), has in his "Diseases of Western Africa," p. 354, given opinions most unfavourable to its utility to Europeans on account of its unhealthiness. Dr. Daniell, on the other hand, who, having resided there, is better qualified to judge, combats this assertion, and states that in most parts it is quite healthy, and that to pass a general censure on its influences is quite unwarranted from experience. The low shores in some parts, among which the settlement of Clarence may be included, are very productive of disease at some seasons, but this is merely local. "Had those individuals whose anxiety has hitherto been to depreciate the utility, or decry the healthiness of this island, been resident for the same number of years with myself and others in the pestilent swamps of equatorial Africa, they would ere this have learned to appreciate the value of the boon so appropriately placed within the grasp of most African voyagers, and one which, above all other considerations, is prized by the convalescent, viz., the rescue from a premature death, and the restoration to the usual occupations of ordinary health."[*]—*Dr. Daniell.*[†]

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* Medical Topography, &c., pp. 134—137.

The appearance of the island is extremely beautiful. Two high peaked mountains (one of them remarkably so), the black sand on the beach, and the scoriæ and other substances, which had evidently undergone the action of fire, denote it to be of volcanic origin.[‡] From the northern extremity the land rises, in a gradual slope, to a ridge of hills which connect the two peaked mountains, and the whole surface of the slope is covered with a forest of trees of the most luxuriant growth. Beyond this region of wood, the crest of the hills, and the sides of the mountains, as far up as about one-third of their height, appeared to be generally in a state of cultivation; on the summits of these hills stand the towns and villages of the natives. The houses are of wickerwork, all nearly of the same size and plan; they are built round an open area, and each is surrounded with a railed fence, or inclosure, within which their cattle are shut up at night.

"Numberless little streams were trickling down the sides of the hills into a noble bay on the North side of the island; besides three very considerable rivers, one at each extremity, and the third about the middle of the bay; at all of which ships may water with the utmost facility. A small island, covered with wood (which may be procured here in any quantity), and inhabited by about a hundred families, who subsist by fishing, affords shelter to that part of the bay within it. Though the thermometer of Farenheit rose to 86° in the afternoon, the land and sea breezes gave to the temperature a freshness quite unknown on the adjacent coast. And, as a proof of the goodness of the climate, it may be observed, that no appearance of those loathsome diseases, elephantiasis, scrofula, guinea-worm, hydrocele, &c., to which the negroes are so subject, was perceptible among the many hundreds who crowded to the coast on the occasion of this visit.

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[*] The following table, carefully drawn up by Dr. Daniell from his own observations, combined with those of Colonel Nicholls and Mr. Becroft, chiefly made at the Government House, will give a clear view of the nature of the climate:—

Months.	Temperature. Fahr.				REMARKS.
	6 a.m.	2 p.m.	8 p.m.	Mean.	
Jan.	72·0	85·0	80·5	79·1	Fine, clear weather; with light and pleasant breezes.
Feb.	73·0	86·0	84·5	81·1	Fine, but rather sultry weather; fair sea breezes.
Mar.	72·5	87·0	81·0	80·1	Fine weather; light airs and sea breezes, occasionally sultry.
April	71·0	84·0	80·0	78·3	Weather much cooler; slight rains towards the end of the month.
May	70·0	80·5	74·0	74·0	Rains and strong sea breezes; occasionally tornadoes.
June	69·5	80·5	70·5	70·5	Rains heavy; cloudy weather, with tornadoes.
July	71·5	80·0	74·5	75·3	Rainy and cloudy weather; with occasional tornadoes.
Aug.	70·0	80·5	76·0	75·5	Rains decreasing; frequent calms, and slight showers.
Sept.	67·0	79·0	78·0	74·7	Ditto; slight showers, light sea breezes.
Oct.	71·0	80·0	76·0	75·7	Fine weather setting in; sea breezes, with occasional showers.
Nov.	73·0	83·0	76·0	77·3	The commencement of the dry season; fine weather.
Dec.	73·5	84·0	76·0	77.8	Fine, clear weather; sultry, with light winds.

[†] Medical Topography, &c., p. 162.

[‡] The peak (Clarence Peak) was first ascended by Mr. Becroft in 1843, when the crater appeared to have been of a very ancient date, and was composed of pulverulent lava, around which existed a circular space destitute of any vegetation. In altitude it is 10,190 feet above the level of the ocean, and in fine clear mornings of the rainy season may be observed from the town of Old Calabar, a distance beyond 100 miles.—*Dr. Daniell.*

"Round the bay the country rises in a grand and beautiful amphitheatre. 'Next to the Bay of Naples,' says Captain Kelly, 'I know of no place more capable of being converted to a finished picture by the hand of art and industry than this; let only the immense forest on the slope give place to cultivated plantations of sugar canes, the brows of the hills be studded with coffee trees, and a town of sufficient importance to form the capital of the island be built on the rising ground near the East angle of the bay, where a river would flow beneath it, navigable for boats drawing 7 and 8 feet of water; and Fernando Po would far surpass any of the islands of the British possessions in the West Indies.'" *

As was stated before, the assumption of its government by the Spaniards has changed its nomenclature, but as the charts are all from British surveys the original names are retained, and the more recent Spanish terms are added to them.

CAPE BULLEN (Cabo Formoso), the N.W. point, is a considerable projection to the S.W., and also to the East of which the coast forms small bays. Around its foot are a large number of rocks, which do not extend far off, and, moreover, most of them are visible. On its summit are some remarkable and very high trees. The North coast of the island runs nearly in a straight line to Cape Horatio, the N.E. point, presenting a great number of small bays, the chief and best of which is Maidstone Bay (Santa Isabel).

At 4 miles S. 60° 30′ E., *true*, from Cape Bullen is a low point called *Ponta de la Trinidada*, remarkable by a large tree; it is the West point of a slender bay, with a sandy beach 1 mile in extent. Its East point is *Ponta del Condo*, pointed and projecting, and separating it from *Cockburn Cove* (Bahia da Venus), which, like the former, has a brook, *Cockburn Brook*, running into it, but otherwise full of rocks. *Point Adelaide* (Ponta Christina), a projecting hummock, separates the latter from the *Bay de St. Isabel.* Off Point Adelaide is *Adelaide Islet* (Isleta Don Henrique), which from the offing appears as three islets. It stands on a bank of from 3 to 10 ft. water, and forms, with those off Adelaide Point, a passage not more than 100 yards wide, and 9 or 10 fathoms deep. The islet and its surrounding shoals form the western side of Maidstone Bay. The mark for clearing the edge of the bank is to keep rather to the East of Point Adelaide.

The island, being a Spanish possession, ought in reality to possess a Spanish nomenclature; but having been surveyed and occupied by the English, most of its points and features are generally known by English names. Nevertheless, as there are Spanish names now superadded in the ensuing description, &c., we have included them, written in parentheses, where they occur simultaneously.

MAIDSTONE BAY (Santa Isabel Bay) is a shallow bay, 2½ miles in extent, with soundings gradually shoaling inward from 24 fathoms. On its eastern side it is bounded by a tongue of land, named *Point William* (Peninsula Fernanda); within which, on the West, is a semicircular bay, called *Clarence Cove.* The western point of this cove, Point Adelaide (Ponta Christina), bears from Point William S.W. by W. ½ W., at the distance of half a mile. Adelaide Islet, off Point Adelaide, according to Captain Vidal, is in lat. 3° 34′ 48″ N., long. 8° 47′ 17″ E.

This place was surveyed by Lieut. James Badgley, R.N. and from this gentleman's plan, which is on a very large scale, we gain the following particulars:—Latitude of the flagstaff on Point William, 3° 45′ 36″ N., long. 8° 45′ E. Variation of the compass, 20° W. High water, on full and change, at 4ʰ; rise, 7 feet.

CLARENCE, or Santa Isabel.† —The anchorage of Clarence Cove, the principal roadstead of Fernando Po, situated on the North side of the island, is very good, though the depth is from 10 to 15 fathoms; indeed, it is so abundantly sheltered, that considerable facility is afforded to vessels loading and unloading; while the perfect tranquillity and smoothness of the water, and the rise of 7 feet, admit of vessels being beached for repairs without danger. At present a fire is kept up by the Company's servants during the early part of the night, and being at the height of 100 feet above the level of the sea, it may be seen at a considerable distance. By bringing this on a S. by E. (*true*) bearing, and Point William 1 or 1½ mile distant, fair anchorage and a good position for entering will be found. It must be borne in mind that the current runs to the East and N.E. generally, 1 to 1½ mile per hour, and due allowance must be made for this, in steering either for the settlement by day or the light by night, depending on the preceding winds. Change in the bearings would give notice of this, and they should be attended to strictly.

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* See Mr. Consul Hutchinson's Impressions of Western Africa, chapters xii. and xiii. for a good account of the island and its people in 1856.

† Description, &c., by Captain Fishbourne, R.N. It should be remarked that a great change has been affected since the Spanish assumption of authority.

The water is good, and may be obtained in any quantity without difficulty. Wood is plentiful, and of very superior quality, quite equal to the mangrove; 340 ins. per horse power per hour being sufficient to keep steam with our engines working expansively at half stroke, yet still an efficient fuel. We paid 6s. 6d. for 100 pieces, containing about 33 cubic feet; but were a contract entered into for a large quantity, it might be obtained at a much more reasonable price.

The landing-place is convenient at a wooden pier, which was built at the expense of the West African Company, and extending out to a depth of water that admits of vessels of 7 or 8 feet draught to go alongside.

The ascent to the plateau, upon which the town stands, being about 100 feet, and the road ill made, occasions much difficulty in the transfer of goods to the town; but this objection might be materially removed, and without much expense. There is a strip of land at and on either side of the landing-place (from which the cliffs rise nearly perpendicularly), now partly occupied by miserable coal and store sheds, but of sufficient width, and generally adapted for good store room.

Clarence Town is situated on a plateau, 100 feet at least above the level of the sea, and receives much of the prevailing S.W. wind; but as this passes over a portion of land not yet quite clear, its salubrious effect is much diminished, as it must be surcharged with vapours. The houses are built of wood, seldom of more than one story, regular and cleanly; even taste is perceptible in their little arrangements, and a measure of comfort which implies circumstances far removed from want.

The fall of water in Hay and Horton Brooks, the former quite close to the town, is fully equal to turning mills for sugar, corn, and wood; and the ground so well adapted, that little expense would attend the preparing sites, &c., for regulating the supply of water.

Though this place is so near the Bonny, Calabar, and Camaroons, few vessels touch here; nearly all going to George Bay, where there is a settlement of Kroumen, who sadly maltreat the natives, and even supply the shipping with yams at their expense, or only give them nominal value.

I believe it is not generally known that there is excellent anchorage all along the North coast of Fernando Po, from the West point of Maidstone Bay to within a mile or two of Horatio Island. If bound to Clarence in the night, any ship may run round Cape Bullen with the greatest confidence, and anchor in 18 or 20 fathoms water, with the peak, which is generally visible, bearing S. by W., or South; she will then be to windward of the harbour, and in the fairway for it. When at anchor in the harbour, the peak will bear S.S.W. This is a good mark for finding the cove in the night.

Eastward of Point William there is less water; 10 fathoms, with soft bottom, will generally be found at a short half mile from the land; but it is most prudent to anchor in not less than 12 or 14 fathoms. The stream anchor is sufficient to use outside the cove, and when inside, the bower anchor.

The centre of Clarence Cove is an excellent berth for anchorage, and the depth will be 13 or 14 fathoms.

"A strong and useful wharf formerly stood in the centre of Clarence Cove, and constituted the landing place of the town; it has now partially disappeared, and the black sandy beach on either side of it answers the purpose. Some ruinous sheds and storehouses, once the property of the defunct African Company, lie around it; and to the left of them, on the strand, is a cleared space, on which the trading canoes of the natives are drawn up.

"The road leading to the town obliquely winds to the summit of the almost perpendicular acclivities, nearly 100 feet in height, the ascent of which, from their steepness, is extremely inconvenient. Commanding a prospect of the bay, is a range of seven or eight substantial and well built houses, whose snow-like exteriors may be discovered many leagues distant. They are now inhabited by the missionaries and more opulent colonists. Paradise, Government, and Longfield houses (the latter recently pulled down), were erected at the expense of the British Crown, and originally formed the residences of the executive and commissariat officers. Midway on Point William* is the building that once was reserved for the hospital of the settlement, and the sickly crews of vessels, but now ignobly desecrated by mercenary uses wholly in opposition to the humane intention of its founders. Though of restricted dimensions, and somewhat inefficient in its internal economy, its healthy and congenial site, isolated from the town, with its loitering inhabitants, somewhat partially redeems these deficiencies.

"In the vicinage of the hospital may be traced the ruins of the magazine (built of stone), blacksmith's shop, and other buildings; and further to the northward may be seen a small monumental obelisk, with an appropriate inscription, recording the melancholy fate of those persons who perished in the ill-fated Niger Expedition.

"The town of Clarence is erected on a clear and level area, greatly declining as it approaches the base of the chain of woodland hills that skirt it on the West. The plan of the town is that of a square, whose largest diameter exceeds three-quarters of a mile, from the lateral prolongation of the houses at irregular intervals. Two or three principal avenues pass from one common thoroughfare on the verge of the beach, and are intersected at right angles by a number of lesser streets, all of which are uniformly wide and spacious, but disgustingly dirty. The native dwellings, composed of pieces of wood roughly fashioned and put together, and roofed either with shingles or palm leaf mats, seldom rise above one story in elevation, except in a few instances, such as those of the more respectable inhabitants, and the government officers previously alluded to. They occupy in picturesque arrangement both sides of the street, the majority of them being whitewashed externally, which gives the whole an air of neatness and comfort. The greater portion of these habitations, however, are falling into a state of decay.

"To the southward of the town, half concealed by thickets and dense masses of foliage, is the burial ground of the colony. In it lie interred the remains of Richard Lander, Captain Bird Allen, R.N., Dr. Vogel, the celebrated botanist, and others, whose graves, with those of the inhabitants, are overspread by a luxurious carpet of grass and weeds. Behind the cemetery is Hay Brook, a rivulet of fresh water, highly extolled by the inhabitants for its excellent qualities, particularly for the cleansing of clothes and other domestic uses. On the western outskirts of the town is a congregation of mud hovels, termed Kru Town, from a number of stray Krumen making it their temporary home. From this suburb a road to the left leads through the woods to Cockburn Cove, a mile distant, into which a small running stream (Cockburn Brook) empties itself."†

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* Captain Kerhallet says, in his description of the place, that on the extremity of Point William (Punta Fernanda) is a large tree, to the East of which is the hospital; and farther on the lighthouse stands at 200 yards from the point. This lighthouse was established by the West African Company.

† Dr. W. F. Daniell, "Medical Topography," &c., pp. 144—148.

On the East of Point William is a small bay named *Goderich Bay* (Bahia del Nervion), three-quarters of a mile in extent, and indented by several little coves, in two of which are the mouths of rivulets, called *Hay Brook* and *Horton Brook* (Rio de San Nicolao). Between these brooks, to the distance of three-quarters of a mile inland, there is now cleared level land, on an elevation of between 100 and 200 feet above the sea; and westward of Hay Brook, between it and Cockburn Cove, is similar cleared land. The East point of Goderich Bay is *Point Goderich* (Pta. del Consul), which is low, and some rocks off it. Horton Cove is called by the Spaniards Ensenada de Gravina.

The East point of Horton Cove is *Point Horton* (Pta. Romey), rounded in form, rocky, and having some rocks at its foot. This is the West limits of a small clean cove (*Ensenada de Romey*), the eastern part of which is *Oyer Point* (Pta. de San Nicolao), beyond which is a rocky cove opening to the N.W., bearing the name of Ensenada de San Nicolao. *Bottlenose Point* (Pta. del Amirante), conspicuous from a large tree, bearing E. by S., *true*, 1 mile distant from Point William, bounds it on the East, and is 7 miles nearly West from Cape Horatio, the N.E. point of the island, the coast between being rocky, and with a great number of small coves. The coast is wooded and quite clear.

CAPE HORATIO terminates in a sharp point, near which are some rocks, one of which forms a tolerably large islet. The cape is high, very steep, and densely wooded. From it the East coast trends nearly in a straight line S. 28° W., *true*, to Cape Barrow (Cabo Agudo), the S.E. point of the island. This coast is rocky, abrupt, and broken by a large number of points, leaving between them small coves. At the foot of the cliffs there are numerous rocks visible. About midway between the two capes is a small rocky islet, *Seven Island* (Isleta de Caracas). It is high, but seen from the East it is undistinguishable from the land, although half a mile from it. To the S.W. of this islet is a bay bestrewed with rocks and rocky islets in its entrance.

MELVILLE BAY (Ba. de Caracas) is 3 miles S.W. from Seven Islet. It is clear, but is very deep; there is 64 fathoms at 1¼ miles from its East point. It is entirely open to winds from E. and S.E., which blow violently during the tornado season, and the bank off-shore is very narrow. For these reasons the East coast of the island is never frequented; the anchorages are bad, dangerous; any vessel caught here in a tornado is in the greatest peril.

CAPE BARROW (Cabo Agudo) is a high rocky point, surmounted by a small hill 2 miles inland. It is, like the rest of the island, densely wooded above the rocky cliffs. From this point to Cabo Redondo, the South coast trends W. 20° N., *true*, and has the same characteristics as the eastern side. It possesses no shelter against the very heavy sea frequently thrown in by the S.W. to S.E. winds. The land rises very abruptly to two peaks not far from the coast. *Cabo Agudo*, which is the true S.W. point of this island, is, like the rest of the cape, very steep, densely wooded, and with deep water close to it. *Cape Badgley*, according to the charts, is just to the northward of it.

GEORGE, or WEST BAY, is 9 miles N. 30° E., *true*, from the S.W. point. Its southern point is a slight projection of moderate height, called *Charles Folly* (Pta. San Carlos). From this the South shore of the bay runs directly East for 4¾ miles; it is very much broken and rocky. At the distance above mentioned there is an islet a cable's length off shore, but connected to it by a reef; and beyond this the coast forms a curve sweeping to the northward, the shore consisting of a sandy beach, but the dense woods of the plain behind it reaching nearly to the sea. Several brooks here fall into the sea, from which good water may be got; the best of these watercourses is in the northern part of this bay. *Point Cabras*, the North point of the bay, is rocky and irregular; seen from W.S.W. it terminates seaward in a gentle slope. It is 7¼ miles N. 58° E., *true*, from Charles Folly, which is the middle of George Bay. This bay is quite clear, the depths being from 30 to 35 fathoms in its opening, diminishing irregularly to 7 and 9 fathoms, mud or muddy sand, at a quarter of a mile from the head of the bay. In coming to this bay, it is best to approach it from the southward.

Cape Badgley is the best point to make, on account of the N.E. current which sets along this shore. The bay is perfectly safe and sheltered from all winds; the only thing to be guarded against are the gusts which come from the high lands. Wood and water are easily procured. Should fresh provisions be desired, a gun fired once or twice will bring the natives to the vessel with the same sort of stock as at Clarence Cove, barter being the mode of purchase. The bay is preferable to Clarence as an anchorage; it is easier of access, and is much larger. The seine may be easily drawn, and fish is very abundant. It is high water at 4ʰ; rise 7 feet.

Goat Island (I. das Cabras), in lat. 3° 32′ 50″ N., long. 8° 34′ 38″, is 1½ miles northward of Cabras Point. It is rocky and high. Between it and the point there is plenty of water. At a third of a mile East of this islet is another and smaller; and N.E. of this again a low rock surrounded by breakers; these are called The Kids. The coast at this point forms a small bay with an irregular sandy beach.

From this point to Cape Bullen (Co. Formosa), the West coast of the island consists of rocky cliffs. It is much broken, and in many parts has projecting rocky points, forming as many useless bays. One of these is 9 miles from Cape Bullen, the South point of which is called *Point Achada.* Between this and Goat Island the shore is clear, and has no rocks at the foot of the cliffs. One dangerous ledge alone exists, at 5½ miles N. by E., *true*, from Goat Island. There are two rocks on it whose tops are visible, called the *Boteler Rocks* (Rs. das Aves). The ledge lies North and South, two-thirds of a mile, but is narrow, leaving a clear passage between them and the coast.

CURRENTS.—From what has been said previously relating to the motion of the water at this part of the Bight, it must be manifest that this must present some of the most singular features of any in the world. The Guinea Current, which runs so constantly and rapidly towards the head of the Bight of Biafra, strikes the shores of Fernando Po, which is, therefore, under its influence. The motion of the waters around it, however, appear to be variable. But it may be affirmed, that generally on the West coast the currents run to the N.E. with a velocity of from 1 mile to 1½ miles per hour, and on the North shore they vary between E. and E.N.E. with the same velocity. On the East coast they are found to run to N.E. or N.N.E. when near the island, but further off they take a more and more decided direction to North, N.N.W., and N.W. But they are very variable in this part; their rate is from 1 to 1½ mile an hour.*

The following directions for, and description of, Fernando Po were written by Mr. Finlaison, when under the command of the benevolent Sir George Collier:—

Ships bound from Bonny River to George Bay, on the West side of Fernando Po, should endeavour to make the West end of the island; for there is such a strong current setting to the E.N.E., that, with baffling winds, it will take them several days before they get up, if they once get to leeward. The bay may be easily found by observing the following directions:—When you first see the island, on coming from the N.W., it makes in two peaks. The easternmost one is the highest, and is most peaked to a sharp point; the westernmost is also very high, but is round to the top, sloping gradually to the water's edge. Should you fall so far to leeward as to get the easternmost peak to bear East or E. by S., you must tack and close in with the westernmost side, until you get close to that side, or the West side of the bay; you can then run along shore within 1 or 2 miles of it, until Goat Isle is in sight; the soundings will be found regular, from 30 to 25 and 16 fathoms. To anchor, bring the East peak to bear E. ½ N.; Goat Island, N. by E. or touching *Point Kelly*, the N.E. point of the bay; and the western extreme point of the bay, W. by N. ½ N., in from 20 to 16 fathoms, three-quarters of a mile off-shore. Here two small rivulets, very convenient for watering, and also for wooding, will be found. A ship, if in want of stock, such as fowls, sheep, goats, or game, should fire a gun or two, when the natives will bring down everything they have to dispose of: the only thing they seem to place any value on is any sort of iron, especially knives, swords, &c. The principal ornaments these people wore about the neck were chicken-bones, glass beads, and bits of shells; their hats were made like small baskets, and had a few feathers on them, in form of a cockade. Of their women, the men did not seem to be the least jealous; but it must be admitted that the females were the most modest set I ever met with on the coast of Africa. During the time we were there, no intercourse whatever took place between them and our crew.

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* Manuel de la Navigation a la Cote Occidental d'Afrique, tome iii., p. 20.

George bay is a good place for hauling the seine, and has plenty of fish of different sorts' such as mullet, bream, and various other kinds; there is also turtle in the bay, and the water is good. The natives would by no means allow us to penetrate into the interior of the island.

In the Book of Directions, it was said that Fernando Po makes in three hummocks. When we first made the island, we observed three hummocks, but it was afterwards found that one of them was the high land of Camaroons,—so deceptive is that land at a distance.

ILHA DO PRINCIPE.

ILHA DO PRINCIPE, or PRINCE'S ISLAND, is a Portuguese possession, and although much smaller than Fernando Po, is very remarkable for its physical features and aspect. It is about 9 miles in length from North to South, and 7½ miles in its greatest breadth, but 5 miles is its average extent from East to West. The bank surrounding it extends to the North and East about 3 miles, with irregular depths. To the South it reaches in some parts to 12 miles, as far as the islets named Pedras Tinhosas, and on the West, it seems to extend about 5 or 6 miles off, but this part has not been completely examined. The island lies S. 35° W., *true*, 111 miles from Fernando Po.

Of the discovery of this island the date is not exactly known; the historians of the period having been more occupied in recording the martial exploits of their sovereign, Affonso V., than in reciting the progress of maritime discovery. However, it is tolerably certain that Joao de Santarem and Pero de Escobar, two Portuguese knights of the Casa d'El Rei, in a voyage beyond Cape Palmas, began in 1470, after discovering St. Thomas, Anno Bom, and Cape Lopo Gonçalvez, saw this island on the 17th of January, 1471, the feast of San Antonio Abbade, and hence it was at first called *Ilha de Santo Antao*, or *Santantam*. The name, *Ilha do Principe* (or *Prince's Isle*), was given to it when its revenues from sugar was granted to the eldest son of the King of Portugal about the year 1500.*

The general aspect of the Ilha do Principe is similar to that of Fernando Po; but it is more singular than that island, from the needle-shaped peaks which jet perpendicularly from the mountains in the interior. The Pico Charrote and the Bico do Papagaio are, perhaps, the most remarkable features in the world. The northern part of the island, although high, has only hills, among which a large number of rivulets run toward the sea. The southern part, on the contrary, is a series of rugged and steep mountains, surmounted here and there with those obelisk-formed pieces of granite. The soil is exceedingly fertile. In many parts there are traces of extinct volcanoes, and larger spaces are covered with volcanic stones, called there, Budo Judeu, which serve for building.

The first chain of peaks are connected together, traversing the island from N.W.

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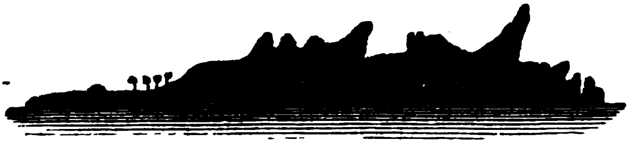
* Ensaios sobre a statistica das Possessoes Portuguezes, por José J. Lopez de Lima. Livro II., parte I., p. 6; and parte II., p. 23; also Torre do Tombo, Livro das Ilhas, pp. 39, 40.

to S.E. The Bico do Papagaio (parrot's beak) is the principal peak, and is remarkable from its hooked form. It terminates on the N.W. shore in the peaked *Pico Pedrim.* A second chain runs at an acute angle, with the former from a peak at the S.E. part of the island to N. 60° W., *true.* In this chain is the *Pico Charrote* (rugged peak), and O Pico (the peak), the highest mountain in the island. It terminates in a perpendicular needle, and is nearly in the centre of the island. It is 2,700 feet high, according to M. Fleuriot de Langle. The Ilha do Principe in clear weather may be seen at 60 miles off, and is easily recognized.



Prince's Island, S. by E. to S.S.E. 15 miles; as seen by Captain James Wallace Monteath.

The productions of the island are coffee and cocoa, or cacao; these are the only articles exported. Formerly sugar was cultivated, but is entirely abandoned. Cinnamon, anotto, black pepper, and cloves, may also be procured. Fruits and vegetables of all kinds are grown, and in the forests are many valuable and useful woods.

The climate, like that of the Gaboon River, is very hot and humid, but not so much so as on the continent. There are but two seasons; that of the tornadoes and hurricanes, from March to September, the pleasantest part of the year; and the rainy season, from September to March, during which period also violent storms are frequent. The dry months are July and August, which is also the period of the S.W. breezes.*

Nearly the whole of the population of the island resides in the town of Santo Antonio, the only one in the island, for there is not another place that merits the name of a village. The total population of the island, according to the official returns of 1844, was 4,584. The number of fire hearths was 624. Of these, there were of whites and mulattoes (pardos), 80 men, 58 women, together, 138; of blacks (pretos), 476 men, 646 women, together, 1,122; of slaves, men, 1,851, women, 1,473, together, 3,324; making the total of 4,584. If the healthiness of the island is indicated by the age of the inhabitants, it must be congenial, for one-fourth of the whites and mulattoes are above 60 years of age, and nearly one-fifth of the blacks are so also. †

In approaching Ilha do Principe, it is generally recommended to do so from the South, to avoid being drifted to leeward by the currents, which most often run to N.E. and N.N.E. at the rate of 1 or 1½ miles an hour. This precaution is most necessary if going to the Bahia das Agulhas, or West Bay; but if bound for that of Santo Antonio, it is not of great consequence whether you round the island to the South or North, as there is no difficulty in fetching the bay from the latter. At 20 or 22 miles to westward of the island a large number of sea mews and other birds are generally met with. In hazy weather this fact is useful, as it is also during the night, when the passage of the ship disturbs them from their rest on the surface, and they rise and utter peculiar cries.—(*M. Kerhallet*).

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* Colonel Sabine's Remarks on the Climate of the Islands of the Bight of Biafra are given on pp. 16, 17, ante. In the work frequently quoted here, "Medical Topography," &c., of Guinea, by Dr. W. F. Daniell, pp. 166, 175—179, 184, will be found some very important remarks on climate, which our space will not allow us farther to extract.

† These particulars, and the description and directions following, are derived chiefly from the work of J. J. Lopez de Lima, just quoted; from the Manuel, &c., of Ch. P. de Kerhallet; the Description Nautique, &c., by Le Comte E. Bouet-Willaumez; and the Medical Topography of Guinea, &c., by Dr. W. F. Daniell, F.R.G.S., &c., in addition to the descriptions given in our former editions.

PONTA DA FLORA is the North and N.E. point of the island. It is rocky, and shows some abrupt cliffs. At rather less than 2 miles North of the point is a naked, blackish, ferruginous rock called the *Pedra da Galé* (or *Galha*), or *Bird Islet*. It is about 10 feet high, and by night is very dangerous, as it is very steep-to. Fish is very abundant near it. There is a clear channel inside it. The *Ilheo Bom-Bom*, to the East of the Ponta da Flora, is high, roundish, and covered with wood; it is clear: hence to *Ponta das Burras*, a distance of 2 miles, the coast is irregular, but there is anchorage off it. The point is high and rocky, but the breakers do not extend far off.

Ponta do Mosteiro (Monastery Point), the N.E. point of the island, is 1¼ mile S.E. of the former point; close to it is a black islet, called *Ilheo de Santa Anna*, and farther off, at 7 cables' length E. by N. of the point, is a cluster of black rocks connected with the point by a shoal. The largest of these rocks is called *Ilheo do Mosteiro*, and is about 25 or 30 feet high. It is very dangerous to pass between these rocks. On the same parallel, at a cable's length off, is a second islet, smaller and lower, called *Ilheo do Diamante*, in lat. 1° 40′ 42″ N., long. 7° 27′ 54″ E., on which the sea breaks with great force. These islets should be passed to eastward not nearer than one-third of a mile, when the depths will be 30 fathoms; and when they bear South you must guard against the current, which sometimes sets strongly towards them. To the South the coast is entirely rocky, and lined with breakers. It forms a slender bay called *Ba. das Cabras*; the bottom throughout it is rocky. Its South extremity is *Ponta do Capitao*, which is clear and steep-to; it is the North point of the Bay of Santo Antonio.

SANTO ANTONIO BAY is the principal bay of Prince's Island, and is comprised between the last mentioned point and that of *Ponta da Garça* to the South, they being very nearly on the same meridian, and 2¼ miles apart. The shores of this bay are very rocky, and between the points are sandy coves, in which there is generally a quiet sea. There is an inner bay, which cannot be made out very well from the offing, and at the head of this is the town of Santo Antonio. The bay has the inconvenience of being exposed to E. and S.E. winds, which blow during the tornadoes, but it has good holding ground. It is also somewhat difficult to penetrate, on account of the usual North and N.E. current, and the prevailing South and S.S.E. winds.

Ponta da Capitao, as before stated, is steep-to; it is a narrow tongue of moderately high land, and is the East point of a secondary bay called *Prayá das Formigas*, which has a fine sandy beach. *Point Santa Anna*, which is the West point of this beach, is high and wooded, with low cliffs, on which formerly stood a small fort. Off this point, a cable's length distant, is a group of islands called *Os Roques*, the highest being 65 feet high, covered with bushes. At one-third of a mile S.W. by W. of this is an isolated rocky head, with 12¼ feet water over it; it does not show, and, being 2 cables' length off shore, requires caution. On the summit of the hills above the bay to the West of this point, where the cliffs end, is a small chapel, that of Santa Anna. Beyond this the coast is high and wooded, but the rocks forming it will allow of landing in the small sandy coves between them. The North shore continues of the same character up to the town, before arriving at which, two large houses are seen; the first called *Casa Ferreira*; the second, Casa Gaetana, which is the residence of the governor. Landing is easy here at the pier or jetty constructed in front of it. Boats cannot go farther up the bay than this.

The CITY OF SANTO ANTONIO, as it is magniloquently styled, extends across the head of the bay between two rivers, that of Dos Frades to N.W., and Do Papagaio to S.E. It stands on a low, marshy plain, over which the sea sometimes flows into the streets. It is sheltered by high hills, mountains covered with wood, and so damp, that the houses are compelled to be built on piles, the ground floor between which is the usual habitation of domestic animals. The houses are built of wood, of a wretched appearance, and often tumbling down in ruins. The town is tolerably regular, and reckons six churches. It may be easily imagined what the salubrity of the place is from its position, under a burning and humid climate. Yet the population returns do not warrant us to infer that the climate is very deadly to the residents.

From the Rio do Papagaio the South shore of the bay runs to the eastward, and is of the same appearance as the North side. At one-third of a mile from the town there is a watercourse flowing through a very deep valley, which furnishes excellent water. It is called the *Agoada dos Portuguezes.* Near it is a large house, called San Joao; and at four-tenths of a mile farther on is a second watercourse called the *Agoada dos Franceses,* also an excellent watering place. In general it is best to procure supplies from any of the brooks here at low water. Near the latter brook is the coaling depot for the steam vessels of the French stationed on this coast of Africa.

From hence the coast trends to the North, a large projecting point called *Ponta do Demonio,* on which is a fort, mounting 10 or 12 guns, in which is a staff, carrying the Portuguese flag. This Fort da Mina has its walls whitewashed, and hence is easily made out. *Ponta Pequena* is high and wooded, as is the whole of the coast. Off it is a reef, a cable's length in extent. It is above half a mile from Ponta do Demonio, and is the West point of the bay of the same name, which is the best anchorage a vessel can take which draws above 13 feet, because it is sheltered from all winds. Its East point is called *Ponta do Risco* (Danger Point), so called from some projecting and covered rocks. The bay called *Praya Salgada,* to the East of this point, is deep, but the soundings do not show more than 4 to 13 fathoms water. There is a water current at the head of the bay in each angle, near each of which is a large house and a chapel. From *Ponta Abbada,* the East point of this bay, to Ponta Garça, a rocky projecting cape, covered with trees, the coast trends South and S.W. The latter cape is steep-to, and may be rounded closely.

Anchorage in the Bay of Santo Antonio may be taken with the flagstaff in the fort bearing S. by E., and the chapel of Santa Anna about N.E., in 5 fathoms, muddy bottom. This is the best sheltered spot, but it is close to shoaler water. It is high water in the bay at $3^h 45^m$; the tides rise, at springs, 6½ feet, at ordinary times 5 feet 10 inches, and are very regular. The currents are not so, but the tidal streams in and out of the bay are weak.

The *eastern coast of the island,* southward of Ponta da Garça, forms a bay 4½ miles in extent, limited to the South by *Ponta da Mai.* The coast of it is formed of rocky cliffs, many of which show deep red patches. A little to the northward of its South end is the point of junction of the two ranges of mountains which extend across the island. Southward of this the coast, always rugged and high, extends to *Ponta do Pico Negro,* the South point of the island: it is a tongue of land, abrupt on all sides, with rocky cliffs, and off its extremity is a sunken rock, which usually breaks. At 1¾ miles S.E. by S. ½ S. from it is a large islet, about 350 feet high, covered with bushes. It is of a singular form, and is called *O Caroço,* or on some charts *Ilheo Carocha* (the Mitre), by the English called the *Dutchmans Cap,* from its form resembling a hat of the 17th century. Seen from the S.E., it seems to join the land; it is very steep-to, and the channel within it is clear, and 30 fathoms deep, black sand.

The *South coast of the island,* between Ponta do Pico Negro and Ponta Grossa, forms three bays, separated by rocky points: the shores of each are very rocky, high, and wooded, and are commanded by the high peaks of the southern chain of the island. *Ponta Grossa,* the S.W. point of the island, is a high, rocky cape, formed by a hill called *Barriga Branca.* When viewed from the S.E., it shows two conical peaks close together, called *As Mamas* (the Paps). The point is clear and steep-to. *Ponta da Formiga* is 2⅝ miles N.W. of Ponta Grassa; it is the South point of a small cove, with a sandy beach, but which does not afford any shelter.

PONTA DAS AGULHAS is the western point of Prince's Island, and is also the S.W. limit of the West Bay, the safest and best on the island. The point is surmounted by a peak called *Focinha de Cao* (Dog's Snout), which stands S.E., three-quarters of a mile from the point. From this the point slopes gently down to the sea, and terminates in a large rocky islet, called *Pedra das Agulhas.*

WEST BAY, or BAHIA DAS AGULHAS, which is bounded to the N.E. by Ponta Pedrinha, distant from Ponta das Agulhas 3 miles to N.E. by E. ¼ E., is 1¼ mile deep within this line. When seen from the West, this bay is very remarkable. In the foreground appear five points, which are like five conical islets, as the low land behind them does not show at first; behind these are the Bico do Papagaio, the Charotte, and O Pico; and to the right the peaked rock called Pedra das Agulhas, so that it well deserves the name of Bahia das Agulhas (the bay of needle-shaped peaks). It is sheltered from S.W. winds, and also perfectly so from the S.E. winds of the tornado season. It is clear of all danger, and the depths diminish gradually from 27 fathoms in its opening to 16 fathoms, sandy mud, a little to the East of Ponta das Agulhas.

The land at the bottom of the bay is low, and formed by hills separated by valleys, through which flow a great number of brooks, which furnish excellent water; one of the best of these is to the West of Roca Ferreira, a large house on a hill a little to the East of Pta. das Agulhas.

The English have a coal depot in this bay, for their steam vessels on the African station, employed in the suppression of the slave trade. It is high water in the bay, at full and change, at $3^h 37^m$; the tides rise 5 feet 10 inches. Tempests frequently occur, in which, at times, the wind blows from the N.W., when it is necessary to look to the moorings; but in general there is no danger. The high lands attract rain; and it frequently happens here, as at the Bay of Santo Antonio, that it rains heavily and for a long time on the land, without a drop falling on the shipping afloat.

Ponta Pedrinha, in lat. 1° 38′ 20″ N., long. 7° 21′ 47″, falls into the sea in a rocky cliff; it is surmounted by a hill, the termination of the central chain. To the North of the point is a small bay with a sandy beach, the North point of which is worn through by the sea, and called *Ponta Furada* (pierced point). Beyond this the coast, still rocky, forms another bay, bounded by *Ponta da Broa Pequena* (Point of the Small Loaf), which is 1¼ miles North of the Furada. The coast throughout is clear, and with depths of 9 to 12 fathoms almost touching the shore. *Ponta da Mai-Martha*, two-thirds of a mile North of the former, is the West point of a tolerably large bay, of which Ponta Flora is the East limit. It is clear of danger, and has good and safe anchorage; the only drawback being that common to all the bays of the island, that of gusts of wind and calms, caused by the mountains. At the bottom of the bay Mai-Martha is a house surrounded by some huts and numerous streams.

The **PEDRAS TINHOSAS** (scurfy rocks), or Os FRADES (the Brothers), are two conspicuous islets to the South of I. do Principe. The largest and highest, which is about 130 feet in elevation, lies 15 miles S.S.W. ¾ W. (S. 9° W., *true*) from Pta. das Agulhas. The other, which bears S. 13° W., *true*, 13 miles from the same point, is also high. They are covered with bushes on their summit. The large isles show two paps when seen from East or West, and the smaller one is of a square form, and at its S.W. side is a large detached rock. They are both marked with white patches, caused by the dung of the sea birds. They are connected with I. do Principe by a bank of soundings, which is narrow at its South end, but widens to northward; the depths on it are considerable, from 30 to 50 fathoms, gravel, sand, and in some places rocky bottom.

Captain Fishbourne gives the following observations on Prince's Island, which he visited in December, 1841:—On leaving Clarence Cove (Fernando Po) for Isle Prince, or the South, you are recommended to steer to the eastward, leaving the islands to the West of you, but without sufficient reason. Although you avoid the current, you have to run to leeward a greater distance than the current could have carried you, and all which distance is to be made good against the current. If you are bound out of the Bight, or to any of the islands, in steering for North-West Bay, Isle Prince, where we were bound to, allowance must be made for the easterly set of the current. A sailing vessel making it to the southward of E.S.E. had better stand on all night, or till she could weather the island, thus passing to the southward of it; but it should not, except under the most favourable circumstances, pass between the Dutchman's Cap and Isle Prince, as the winds there are baffling and currents variable. In this way she may arrive early on the following day. I have known a vessel to have been three days beating up on the North side, which will surely follow if the master or captain is timid, as he will lose at night his daylight labour. The South side of the bay is to be avoided, as the ground is foul, till you get into 14 fathoms, where there is good anchorage, freest from rain, but at a long and inconvenient distance from the watering place. Vessels may go into 8 fathoms without apprehension, bringing Madame Ferreira's house to bear about E.S.E. (East, *true*).

This lady is of considerable notoriety amongst the African squadron for her hospitality, and her house is easily distinguished, standing on a hill, and being the only one of any size. She supplies the squadron with firewood at two dollars the hundred pieces, 2 feet long by 4½ inches square; and as she thus clears the ground, plants it with sugar canes. She has lately erected sugar and timber mills to be driven by water, at an expense of 10,000 dollars; and though these, and all her supplies, are from France, the Local Junta are jealous of her English intimacy, and will, I fear, prevent her realizing the benefits which her enterprise deserves.—(The works are stated to be abandoned.)

The water here is excellent, and easily obtained in any quantity. The wood is plentiful, but the dark coloured of great specific gravity is entirely to be preferred. Beef may be obtained at Port St. Antonio, or from Madame Ferreira; at times pigs, and poultry, but not in quantity. Guavas, sour-sops, papaus, limes, oranges, bananas, pines, and cocoa-nuts, are to be had here, but yams and sweet potatoes are very scarce, coffee is plentiful, and of excellent quality, 5d. per lb.; cocoa bean is good and cheap here.*

A detailed account of the history and capabilities of this island, which, it may be supposed, exhausts the subject, will be found in the work before quoted, by José Joaquim Lopes de Lima (Ensaios sobre a statistica, &c.), in which all previous notices are incorporated and quoted. With an extract from that work we conclude:—"This island has no internal trade, as it has but one town; neither has it any practicable roads, beyond the Serra do Papagaio and the mountain Dos Picos, and up to these they are rather tracks than paths. The language spoken is the same mixed dialect, *Luso-Ethiope*, as is used at San Thomé, but differently accentuated, and more copious in the African words. The men of the better class are well educated, affable, courteous, and hospitable, speaking and writing Portuguese purely, and some of them acquainted with other European languages. The ladies also understand, read, and write Portuguese. The lower orders are rude, superstitious, and most indolent: they cordially detest their compatriots of San Thomé, who in turn look upon them with equal aversion."†

ISLAND OF SAN THOMÉ.

The Island of San Thomé, or St. Thomas, is another Portuguese possession. It is very much larger than the Ilha do Principe, and of greater commercial importance; but it is less useful in a nautical view, on account of its want of harbours.

The date of its discovery, like that of the preceding island, is now lost in some obscurity, as has been before stated; but the great probability is that it was first seen by Joao de Santarem and Pero de Escobar, two noble Portuguese, who had Martinho Fernandez (of Lisbon) and Alvaro Esteves (of Lagos) as pilots. After discovering Cape Lopo Gonçalves (Cape Lopez), they saw this island on December 21st, 1470 (the feast of St. Thomas). As in the former description, we have drawn our information from the work of J. J. Lopes de Lima, where a full and interesting account of all the particulars of this island will be found.* It was first colonized by Joao de Paiva, in virtue of a warrant from King Joao II., dated September 24th, 1485, which gave large privileges, and these were afterwards extended. Fostered by royal care, this island became the chief emporium of Portuguese colonial commerce; and cultivation, roads, villages, and public walks added very greatly to the prosperity of its mercantile interests. Its chief productions were indigo, sugar, and coffee. In the statistical work mentioned, the progress of this commerce, and the means by which it was fostered, are related, the information being chiefly drawn from the historian, Torre de Tombo. One cause of the decline of the prosperity of this island was the aggression of a body of *Angolares* (negroes of Angola), which had been wrecked in a slave ship on the Sete Pedras, and had lived and increased in the bush, aud in the year 1574, made an attack on the unsuspecting inhabitants. The town of San Thomé was burnt in 1585; and the bush warfare was kept up against them, but they were not completely subdued till near a century afterwards. A chain of troubles, among which the attacks by pirates at different times, and the European war, brought this island, from its once prosperous condition, to a state of ruin. But one of the chief causes of the desolation of San Thomé was the discovery and colonization of Brazil, the superior climate of which, combined with its immunity from the troubles just named, and its vast extent, soon attracted all the colonists of San Thomé thither, and it is now left a wilderness.

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* "Nautical Magazine," February, 1843, p. 86.

† Ensaio sobre a statistica, &c., livro ii., part ii., p. 35.

The Island of San Thomé is divided into eight freguezias, or parishes, two of which are in the town or city; these contained, in 1844, 1,432 fire hearths; of the population, 33 men and 14 women were white or mulattoes, but of these 47, 20 were less than thirty years old, and none above sixty. They all lived in the town of San Thomé. Of free negroes, 2,851 men, 3,081 women; together, 5,932. Of slaves, 1,051 men, 1,139 women; together, 2,190; making a total of 8,169 inhabitants.

The Island of San Thomé is nearly all mountainous. In its central and western parts is a very high peak, called *Pico do San Thomé*, covered with a very dense mass of trees. Its peak is frequently covered with snow, and is 7,005 feet above the level of the sea. At 3 miles East of this is the peak of *Anna de Chaves*, 6,913 feet high, according to the estimate of Captain De Langle. A little to the North of this is another, equally high. From this central mass two chains diverge, one towards the East to the Bay of Mecia Alves, and the other to S.E., having, among other peaks, those of *Maria Fernandez* and that of *Mocondom*, the last being close to the shore. From these last mountains the chain trends to the S.W., terminating in the pointed peaks of *Cao Grande* and *Cao Pequena*. The North point of the island is an extensive plain, watered by a multitude of rivulets.

The island, seen from the N.N.E. at a distance of 60 miles, shows as three very conspicuous mountains; Pico do San Thomé, the summit of which is almost hidden by clouds; the Cao Grande, with its needle-shaped peak; and Maria Fernandez, the top of which is in the form of a sugar-loaf. The island is 25 miles long from North to South, and its greatest breadth, East and West, is 18 miles. It is 80 miles S. 33° W. *true*, from the Ilha do Principe, and this is also the general direction of the island itself. It possesses one of the most fertile soils that can be imagined, but labour is wanting for its cultivation. Its chief products for exportation are coffee and cocoa. The same description of fresh provisions and refreshments may be got here as at I. do Principe. The chief town is San Thome, in the Bay of Anna de Chaves, on the N.E. part of the island, the name of the bay being frequently confused with that of the city. This bay, and that of Santa Catharina in the S.W. part, are the only good anchorages for vessels of any burden.

The following view of St. Thomas's Island, 8 or 9 miles distant, was taken by Capt.

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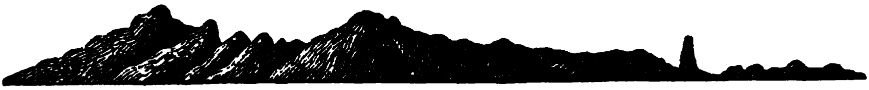
* Ibid., livro ii., part. ii., capitulo i.

Sir George Young, and is presumed to be correct. The summit of the peak is generally covered with a cloud that appears like smoke.



Ponta do Figo is the N.W. point of the island. It is high, peaked, and cliffy. At 1¼ mile East of it is *Ponta Carregada*, low at its extremity, and surmounted by a conical hillock, called *Morro Carregado*. There are rocks extending off these points, some of which cover at high water. *Ponta d'Agoa Ambo* is 1¼ mile East, *true*, from the former point. (On the Portuguese chart the Point is called Morro Peixe, while that so called by M. Kerhallet is without any name). The shore between them is broken, and consists of black rocks. From this last point the coast trends S.E. to *Ponta do Peixe* (or *Ponta do Fernao Dias*), a rocky projecting cape, on which stands the *Morro do Peixe* and the chapel of *San Francisco*. It is a good mark for the anchorage of Das Cabras, or Man-of-War Road.

The Ilheo das Cabras is in lat. 0° 24′ 10″ N., long, 6° 41′ 31″ E., at 1¼ mile due East from Pta. do Peixe. It consists of two hummocks on a low land. It may be seen at 16 or 18 miles off. Man-of-War Road, or the *anchorage of Das Cabras*,, lies between Ponta Carregada, to the West, and Ponta do Peixe, to the East. It is easily taken, and the northern coast of San Thomé is very pleasant in appearance, as is also the eastern side. A rich verdure covers the hills, and groups of fine trees are scattered over the plains. From the anchorage above indicated a remarkable hill will bear S.W. by W.; it is crowned with a clump of trees, and resembles a helmet or casque, and hence is called *O Capacete*.

Man-of-War Road, on the N.E. side of the island, is a fine spot for small vessels, but large ships are obliged to lie out in the open road, in from 10 to 18 fathoms, where there is good ground and smooth water; though it is dangerous lying there in the season of the tornadoes, as they prevail from the N.E. directly upon the shore.

It appears, from the Journal of Sir George Young, that being at Badagry, and observing in the evening a tornado coming on, they ran up as far as Whydah, and thence upon a stretch to St. Thomas's. The island was made in eight days, but four or five days more elapsed in getting round to the bay.

The marks for anchoring in Man-of-War Road are, Ilheo das Cabras, or Goat Isle, making like a saddle, and bearing S.E. ¼ S.; San Francisco (or Misericordia Chapel), seated on a hill, on with a black rock upon the shore, and bearing S. by W.; the white mansion house upon the shore, called Fernandilla house,* S.W. ¼ W. From the latter, the watering place is only a quarter of a mile to the eastward.

The watering is very easy here, from a fine, small, rapid river, called the *Rio do Ouro*, that vents itself into the sea, and which is a great deal better than the river at the town, where the women are for ever washing with nasty, stinking palm oil soap. Plenty of wood is also to be obtained here. It is better to land, for watering, a little to the West of the river, as there is a strong surf on its bar.

Man-of-War Road is a preferable anchorage to that of Anna de Chaves, particularly in the tornado season; as the winds, which blow directly into the latter bay, lead clear out to sea from the former.

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* From the results of a great number of observations in May, 1822, Captain (since General) Sabine has given the position of Fernandilla House, lat. 0° 24′ 41″ N., long. 6° 44′ 43″; and hence the roadstead of Sta. Anna has been given in the longitude of 6° 49′ 13″.

The water, also, is not only much better in the former, but is more easily obtained. Beef and other refreshments, except what may be brought on board by the canoes, must however be sent for to Anna de Chaves, the market place here being well and reasonably supplied with tropical fruits, vegetables, eggs, fish, poultry, pigs, goats, and cattle.

Close to the landing place at Man-of War Road is the large stone mansion belonging to the extensive estate of Fernandilla; and at a short distance inland, on the summit of an eminence of no great elevation, is a well built brick church, that of S. Francisco, before mentioned.

Ponta de Diogo Nunes, or, as it is called by M. Kerhallet, *Pta. de Vasconcellos*, is 2⅓ miles S.E. by S. ¼ S. from Ponta do Peixe, as it is termed by the latter. Pta. de Diogo Nunes is low, and not easily made out when bearing West; to the northward of it a small river, *Ribeira de Diogo Nunes*, enters the sea. To the southward of the point is a small bay, called *Praya Lagarto*, or *Bahia de Vasconcellos*, from the name of the navigator said to have discovered the island; its shore is sandy, but it can only be used by small vessels. A small river, the *Rio de Melo*, enters its southern corner.

ANNA DE CHAVES BAY.—This, which is frequently but erroneously called the Bay of Santa Anna, lies between *Ponta de Anna de Chaves*,* and that of San Sebastian, which bear from each other E.S.E. and W.N.W., 1 1-10th mile apart. Both these points are rocky, and that of San Sebastiao is very low. To the West of the points a fine beach of white sand, perfectly regular, surrounds the bay, at the bottom of which stands the chief town of the island, called the *Cidade de São Thomé*, and not *Santa Anna*, as it is erroneously called. The bay is perfectly free from all danger, and although it is open to North and N.E. Winds, it offers (but only to small vessels) a safe and commodious anchorage. Those which draw above 10 feet cannot enter sufficiently within the points to be quite sheltered, and are consequently forced to remain outside. The bottom, nevertheless, is excellent throughout.

A bank extends off the N.E. part of the island, the limits of which are nearly marked by the I. das Cabras, as the edge of it, in 5 fathoms, is half a mile East of it. From this point its edge trends about S. ¾ W., so that it meets the shore at Pta. Sao Sebastiao, the South point of the bay. It is called the *Bank of Santa Anna*, and on it the depth varies from 2 to 6 fathoms, sand and shells. This is not the only bank which requires caution by large ships coming from the North to Anna de Chaves, or from South to Man-of-War Road. There are two others, one of considerable extent, called the *Bank de Chaves*, with 6 fathoms on it; it does not show. It may be passed half a mile to southward by keeping Fort San José to West. The other bank is called *B. do Pescador*, and is very small. It is separated by a narrow channel of 5 fathoms from the former one, and has a depth of 6¼ fathoms on it.† Large ships must pass to the South of this to come to the Bay of Anna de Chaves; but as the anchorage for them is exposed, and during the tornadoes the strength of the ground tackle is the only safety, that of Man-of-War Road is preferable. Captain Kerhallet says that he anchored in a corvette drawing 13¾ feet water, with Fort San Sebastiao bearing S.W. ¾ S., and Fort San José N.W. by W. ¾ W., in 5 fathoms, sandy bottom, at 1 2-10th miles from the city.

The City of San Thome, the capital of the island, stands at the head of the Bay of Anna de Chaves; it extends in the form of an arc for 1⅓ mile along the shore, and is half a mile in breadth. Its appearance is pleasing and picturesque; the streets are wide and well laid out. The town includes about 900 houses, built of wood, and covered with tiles, for the most part. Some of them are large, but nearly all have a wretched appearance.

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* This point is sometimes called O'que d'El Rey, Monte d'El Rei, or Cabo Verde.

† It was on one of these banks that H.M.S. *Hind* struck, as related by Sir Home Popham; and also that on which the *Chesterfield* struck in 1781.

There are several churches built of stone; among others, the cathedral (A Sé) la Conceiçao and La Misericordia; there is also the civil prison, the town hall (Casa de Camara); and the custom house, a large building on the edge of the Fio de Agoa Grande to the West of the city. In front of the custom-house they have commenced a quay, which remains unfinished for want of funds. Outside the city, on a hill, is the chapel of the Madre de Dios. In the town are shops, very poor in appearance, but well kept, where furniture, eatables, wine, &c., are sold, imported by European vessels, and chiefly by Americans. A market is held every day in the town, where provisions of most kinds are to be got. Bullocks may be also got by applying to the merchants. Horses, donkeys, and excellent mules are also to be procured. To the South of the city is a large marsh, which becomes a lake during the rainy season. Two others also exist, one to the S.W., and the other to the West. These render a residence at St. Thomé extremely unhealthy during all seasons of the year. The water of the Rio de Agoa Grande, near the customhouse, is excellent; it is very light and agreeable. There is some difficulty in boats entering the river on account of its shallowness; near the entrance it is crossed by a rude bridge constructed in 1850 of simple trunks of trees. The population of the two parishes of San Thomé is 4,475, including the whole white and mulatto population of the island.

The tides are regular in the Bay of Anna da Chaves. They rise 4 ft. 7 in. It is high water (establishment of the port) at $3^h\ 25^m$. The currents are weak and irregular outside the bay, but frequently to North and N.N.E.*

"The country in the vicinity of Anna de Chaves bears convincing proofs of the exuberant fertility of the soil, and the carpet of verdure, enamelled by the exquisite bloom of countless plants, truly announces with what a munificent hand nature has distributed her treasures in the favoured localities of these sunny islands. The edible fruits and vegetables, reared in the vicinity of the town, are chiefly those which custom and a long established requisition has plentifully called into cultivation. It is, therefore, in conformity with these objects that the mandioca, or sweet cassada (*jatropha janipha*), is so universally planted for the manufacture of farinha; inasmuch as it not only supplies their domestic wants, but is a valuable article of commerce. Independent of the slave ships that usually touch at this island to procure a sufficient quantity of it for the subsistence of their living freights, it is likewise transmitted to the other Portuguese possessions in Southern Africa, where, from the aridity of the land and dearth of rain, its production is often a matter of difficulty. The African bean, or callavancy, is another useful product, held in much request by the foreign shipping, and is generally purchased to promote the health of the crews. Limes, melons, oranges, yams, plantains, sweet potatoes, cabbages, pineapples, papaws, maize, peppers, and indeed nearly all the vegetable esculents found in western Africa, are readily bartered for old and worn out apparel in preference to either money or spirits; and this mode of payment equally applies to the Islands of Prince's and Anno Bona, the natives of which are always desirous of receiving such habiliments in exchage for their produce, which is, perhaps, more in concurrence with their taste and vanity for dress. Beef, pork, mutton, goats, poultry, turtle, and fish, may be found, more or less, in the market, the price of the former being regulated by the quantity required by the vessel; it, however, cannot be procured at the same moderate rate demanded in other parts of the Bight.*

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* Captain Fishbourne, R.N., on arriving at Anna de Chaves (December, 1841), found it to be very shoal, as if filling up. Wood and water were very scarce. We failed in obtaining stock, of which, they said, there was plenty; but to be had only by sending into the country. The extreme wretchedness of the town offered too much confirmation of this, to induce us to stop and make the experiment. Some remains still appear of the short-lived wealth and questionable prosperity during the palmy days of kidnapping. Although the soil is so rich, we could obtain but a few miserable vegetables, that were not worth carrying. Sugar and coffee were exported to a tolerable extent formerly, but the planter has emigrated to the Brasils.

Sao Sebastiao Point is the South limit of the Bay. The fort, or *Fortaleza de Sao Sebastiao*, stands on it. The point, according to M. Kerhallet, is in lat. 0° 20′ 30″ N., long. 6° 42′ 38″ E. Variation, 20° 14′ W. At 1 mile from the fort St. Sebastiao is the ruined *fort de Sao Jeronimo*, on a small richly wooded eminence. A large watercourse enters the sea at three-quarters of a mile South of this. *Ponto do Prayao* is of moderate height, and projects two-thirds of a mile beyond the line of coast. Beyond this the line rises rapidly, and at 1 mile from the point is a small conical hill, which is 3¼ miles South of Fort S. Sebastiao. The coast South of this is much broken up, and within the space of 3¼ miles forms two bays, or rather one larger bay separated into two by a rocky point. This indentation is called by the French Manuel the Bay of Mecia Aves, a name applied by the Portuguese to a smaller bay to the South of it. These two bays in question being named *Praya do Almoxarim* and *Enseada de Santa Anna.* These two bays are rocky; those in the northern bay cover and uncover. In the centre of the southern one the chapel of Santa Anna is seen.

Ponta dos Angolares† is 4 miles S.W. by S. of Ponta do Prayao. It is of medium height, and terminates in cliffs toward the South. On its extremity a single palm tree, and some separate clumps of trees, will be seen. The *Ilheo de Santa Anna* (or *Postilian's Cap*), in lat. 0° 14′ 10″ N., long. 6° 44′ 7″ E., according to M. Kerhallet, is a mile off the preceding point. It has a rocky base, moderately high, and covered with bushes on its summit; it may be seen 16 miles off. There is a passage inside it, but it would be imprudent to use it. Off this part of the coast the bank of soundings extends about 3 miles.

The *Bay of Mecia Alves*, to the South of Ponta dos Angolares, is called by the same name as that point by M. Kerhallet, but by J. J. Lopes de Lima is termed as above. It is a small sandy cove of four-fifths of a mile in extent. Its beach is intersected by three rivers, of which those to the North and South are important watercourses. There are some houses near it, but it has no shelter.

At 7 miles southward of Ponta dos Angolares is a rock called *Pedra Furada* (or pierced rock), which lies near the shore; and three-quarters of a mile beyond this is the *Pico Mocondom*, close to the shore. It is the termination of the chain, which is connected with the central group of mountains, and hence turns to the S.W. To the North of it the *Agoa Izo*, a small stream, reaches the sea, and to the South of it is a small indentation called *Angra Toldo.*

Ponta de Santa Maria, called by J. J. Lopes de Lima, *Ponta dos Morcegos* (Bat Point), is 9 miles S.W. by W. of Ponta dos Angolares. It consists of cliffs, surmounted by a conical hill. To the South of it is the mouth of a small river, *Ponta Fernando Diaz*, or *Ponta Agoa*, which is 2 4-5th miles W. by S. of Ponta Santa Maria; and 1¼ miles West of this is *Ponta Aguili*, which is high, rocky, and slightly projecting. A reef extends off it one-third of a mile, the outer rock of which is blackish, and named *Aguili Rock.* This point is the N.E. point of *Praia de Lança*,‡ or *Angra de Sao Jaoa* a circular bay of about 1 mile in its opening. Its shore is rocky throughout, and three rivers fall into it. At the West part of the bay is the village of the same name. The coast here is very abrupt, formed by the slopes from the Pico do Cao Grande

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* Dr. W. F. Daniell, "Medical Topography," &c., pp. 173, 174.

† This is the name given by the inhabitants to the parish or Freguezia of Santa Cruz, which is on the northern slope of the Pico de Maria Fernandez. The village of Santa Cruz stands on the summit of a mountain.—*M. Kerhallet.*

‡ It may be again observed that these names, as given by M. Kerhallet, do not accord with those applied by J. J. Lopes de Lima, but they are both given here.

(Great Dog Peak), which rises about 2¾ miles North of the bay. The anchorage in the bay offers no security.

The S.W. point of the bay is *Ponta Diego Nunes*, having many sunken rocks at its foot. It is surmounted by the *Pico Macuru*, according to the Portuguese authority. *Ponta Preta* (Black Point), or *Ponta do Ilheo Grande*, is 1¾ miles S.W. ½ S. of the former, and is the West point of a narrow but deep bay, called *Bahia de Pramanga*, which, being open to the S.E. winds, is only used by small coasters of the island. *Ponta Pramanga*, its S.W. point, is a large rocky point, with a hill on it close to the sea. Above the cliffs is a flat-topped hill, on which stands the village of *Santa Catharina.*

As Sete Pedras (the Seven Stones), a reef about half a mile in diameter, lies 3¾ miles E.S.E. of Ponta Preta. The largest and highest of these rocks are in the centre of the group, which by day is not dangerous, but by night requiring great caution, as it is very steep-to. It stands very near the edge of the bank of soundings. The passage between them and the coast varies in depth from 32 to 30 fathoms.

Ponta da Balea.—The South point of the island, 1½ miles from the former point, is in lat. 0° 0′ 45″ N., long. 6° 29′ 42″ E., according to M. Kerhallet. It is pointed, rocky, and surmounted by a small conical peak. The variation here is 20° 14′ W.

The ILHEO DAS ROLAS is the largest of those surrounding Sao Thomé, being 1 1-10th miles from N.E. to S.W., and nine-tenths of a mile from N.W. to S.E. It is high, covered with large trees, among which are some cocoanuts, and has at its North part a small conical hill. Seen from a distance, it shows as two islets. The island is remarkably placed, as the Equator cross its North end. The only landing is on the North side, in a valley, near which are two springs, which are connected with the sea in some way, as they ebb and flow with the tide. The island is, or was, inhabited by a single individual, and poultry, pigs, and goats, may be got. A vast number of turtle doves (*rolas*) live in the woods, and give name to the island. The channel between it and the coast is safe, and from 7 to 10 fathoms.

There is good anchorage in this channel to the N.W. of the Ilheo das Rolas, in 5½ to 4½ fathoms, with the summit bearing S.E. at two-thirds of a mile distance, and here is shelter against the S.E. winds during the tornadoes. In any case, should the vessel drive, she can get out to sea; but the anchorage is not good for South and S.W. winds, which generally make a heavy swell.*

The Bay of *Santa Catharina*, which lies to the North and West of Ponta de la Balea, and is a curve 2 miles in extent, is named from the village. There is no fresh water in the bay. The North point of it is called by M. Kerhallet Santa Catharina; by Sen. de Lima, *Ponta do Homem da Capa*, and consists of high cliffs. At a mile to the West of it, according to the latter authority, is a reef called *Balza do Flamengo*. The *Ilheo Macaco* (Monkey Island), a high rock close to the shore, is 2½ miles northward, and lies in a line with the two peaks of Cao Grande and Cao Pequeno. There are two other peaks above the cliffs, called *Pico da Praya Lança*, and *Pico da Preta*. Near the island are some fishermen's huts. The bay to the southward of it is called *Praya Grandé do Calaboyo*, and that to the northward *Praya da Preta*, or *Praya Lança.*

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* Captain Fishbourne says, "The anchorage between Ilha das Rolas and St. Thomas, in 6 fathoms, where we stopped after leaving Anna de Chaves, is well sheltered and convenient for wooding; but water can alone be got from Isle St. Thomas opposite, and there in any quantity, and very good. We obtained a small supply of pigs, poultry, turtle, and fish, every day. The officers succeeded in shooting a considerable number of wood pigeons and doves, which proved a grateful addition to the sick men's mess.

"The Bay opposite, in St. Thomas's, is far from being a desirable anchorage; even a steamer, without coal, will find a difficulty in coming out at times: green wood giving a very insufficient quantity of steam to make head against the cross sea which generally prevails here"

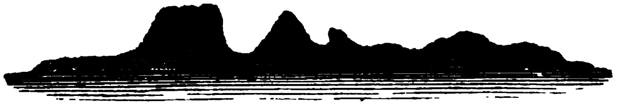
Ponta Gabado, 4½ miles North of Macaco Island, is formed of cliffs, and is remarkable for three rocky islets, equally high, near it. The S.W. and largest is called *Ilheo de S. Miguel;* that to S.E. is *Ilheo Gabado;* and the North is *Ilheo Formoso;* the two largest are covered with bushes. The *Morro de Souza*, a small hill standing above the sea, is 2½ miles North of Ilheo Formoso, and is recognisable also by a small, low, rocky island, *Ilheo de Joanna de Souza*, close to the coast. A reef is marked on the Portuguese charts as extending southward from the Point. *Ilheo Venangelo* is three-quarters of a mile beyond the last island, and high and wedge-shaped. *Ilheo Coco* is 1½ mile from the Morro de Souza.

Ponta Furada, formed of low perpendicular cliffs, pierced by the sea, is the West point of the island. According to M. Kerhallet, it is in lat. 0° 13′ 50″ N., long. 6° 25′ 49″ E. *Ponta Alemao* is 3 miles beyond this to the northward, and is the South limit of a shallow bay called *Enseada de Santa Catharina*, the North limit of which is *Ponta Diogo Vas*, 3 miles beyond. The coast here rises rapidly towards the *Pico de Sao Thomé* and the central chain of the island. From the last named point to Ponta Figo, the N.W. point of S. Thomé, the only projections noticeable are *Ponta da Prainha* and *Ponta Cadao*, which project slightly beyond the line of coast.

The whole of the West coast has been but little examined or frequented, and ought to be avoided, especially during calms. It has very few inhabitants.

ANNO BONA.

ANNO BONA, or ANNO BOM, is a beautiful little island, in lat. 1° 25′ S., long. 5° 36′ E. It is inhabited wholly by blacks, who formerly considered themselves subjects of Portugal, but the island is now claimed as a possession of Spain. The island is of a conical form; and around the base, next the sea, is a narrow margin, about a quarter of a mile in breadth, which is covered with groves of cocoa-nut and plantain; the cone itself is beautifully wooded to the summit. The natives appear simple and inoffensive, and obtain their subsistence chiefly from the sea. The town is prettily situated on the margin of an open bay on the N.E. side, in a grove of cocoa-nut trees, and may contain 400 or 500 inhabitants.



Anno Bom W.S.W. 12 leagues, as seen by Captain James Wallace Monteath.

The island was probably first discovered by Joao de Santarem and Pero de Escobar on Jan. 1, 1471, and was named Anno Bom, or *Good Year* Island, from being first descried on a New Year's Day. Its central land is so high, that it may be seen, in clear weather, at the distance of 10 or 12 leagues; and its shores may be approached with safety, in any direction, so near as a mile. Its base, where it emerges from the sea, is about 30 miles in circumference; from which the land rises, in varied and picturesque forms, to a considerable elevation in the central parts of the island, nearly the whole of which is covered with orange and lime trees; and on the summit of the sugar-loaf mountain there is a pond of fresh water. The anchoring place is on the N.E. side of the island, where there is a town near to the shore, defended by a small intrenchment of stones; abreast of which, and about half or three-quarters of a mile from the beach, there is from 10 to 15 fathoms of water, good sandy holding ground, very smooth riding, and a convenient landing-place. Off the S.E. point of the island, and at a good distance from the shore, is a small island or rock in the form of a sugar-loaf; between which and the land there is a good passage for ships; and near the shore, approaching the anchoring-place, are seen seven rocks above water, which should be carefully avoided, as also a sand-bank to the northward of the town. On the S.E. side of the island there is good fresh water, which runs down the mountain through a valley of orange trees; but the watering is rendered somewhat difficult by stones and breakers.

The wind about the island blows with a moderate force, and little variation, from the South and S.W. quarter, throughout the year; so that, as ships lie there under shelter of the land, they ride at anchor exceedingly easy and safe, and the navigator has little or no danger to apprehend from wind and weather, excepting about the months of March and September, when tornadoes, or strong gusts of wind from the eastward, prevail at times over the general sea breeze, and blow direct into the anchorage; but, fortunately, the previous gloominess of the horizon to the eastward, and the heavy thunder and lightning by which they are preceded always give timely notice to those who have not the ground tackling requisite for riding them out, to get under sail, and withstand their fury in the offing.

In point of salubrity to European visitants, this island could scarcely fail of proving superior to any of our settlements on the western coast of Africa, and it is much better suited to the constitution of Europeans than the climate of any other African island, situated within the tropics, and at a shorter distance from the continent. It is situated far out of the reach of those pestilential vapours and excessive heavy dews and rains which are so prevalent, and so fatal to Europeans, on the coast of the continent; and it does not contain any marshy land, nor stagnant waters, within its shores.

The island produces plenty of wood, suitable for firing, and is well supplied with pure fresh water, which flows into the sea at a short distance from the anchorage, to the S.E.; and ships may soon procure a supply, either by means of their own boats and people, or by employing the canoes of the natives. It also produces plenty of refreshments, and very cheap. There are cows, sheep, goats, fowls, and many hogs; together with sugar-canes, plantains, bananas, pineapples, cocoa-nuts, pomegranates, oranges, limes, tamarinds, yams, and cassada. But oranges are the fruit with which the island most abounds; the quantity of them is incredible, and they may be obtained all the year round; they are full of juice, and of an exquisite flavour. A little cotton likewise grows on the island, which is sent to Portugal. By properly encouraging the natives, they might doubtless be very soon brought to supply any quantity of those and other refreshments that ships might need; and should anything else be required, such as bullocks, rice, Indian corn, calavancies, and yams, or even ship timber and lumber, the island could be readily and abundantly stocked from the neighbouring continent.

There are about 2,000 inhabitants on the island, who are a mixture of Portuguese and African negroes; the latter people are said to be the descendants of a cargo of negro slaves, that were shipwrecked there on their passage to Brasil. They are, on the whole, a stout, hardy, active, and half civilized people, capable of becoming, under a liberal establishment, industrious, useful, and orderly subjects. Even in their present state of degradation and wretchedness, they may be found extremely useful to ships touching here; for besides fetching them wood and water, should any ship be in distress, through sickness or mortality of her crew, assistance from these people may be obtained on very reasonable terms; and many of them are not only tolerably good seamen, but also capable of great improvement in that capacity; this has, indeed, been often experienced by our Guinea-men.*

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* In a work already quoted it has lately been stated that deadly fevers are, at times, experienced at Anno Bona; that the anchorage is extremely dangerous; its pro-

To those commanders who have visited Anno Bona, or been in the practice of trading to the coast of Africa, no instructions are here required for their government at the island; but it may be necessary to acquaint others, who are strangers there, that under the present circumstances of the inhabitants they do not require money for any of the refreshments or necessaries they can supply, nor are there any established customs payable to them for anchorage or water. Seamen's clothing, coarse woollen and cotton cloths, pocket handkerchiefs, hats and worsted caps, hardware and earthenware, gunpowder, spirits, leaf tobacco and pipes, also salt, and even any sorts of old clothes, are much more acceptable to them than either gold or silver; and an assortment of these articles, to the amount of £5 or £10, will be sufficient with good humour, ingenuity, and dexterous management, to purchase as much live stock, poultry, fruit, and vegetables, as any of our ships might need. Though there is no duty claimed for anchorage or water, it is customary to make a present to the governor of a few of the above-mentioned articles, as also to the priest, and to him who acts as linguist or tradesman.*

The governor of the island is a native. He comes off to shipping in great state, seated in a chair, with an umbrella over his head, and desirous of a salute, which he seldom receives; his principal object being to obtain the presents, which may thus be considered as the port dues of the place.

The island is 3¼ miles long from North to South; its greatest breadth is 1⅝ miles and its least breadth three-quarters of a mile. It is not irregular in its figure, but resembles Fernando Po in this respect. It is, in reality, but a mountain, which rises abruptly from the shore into three chief summits, the highest of which to the North, called the Peak *Do Fogo*, is 3,250 feet high. It is a truncated pyramid, the top being a narrow ledge, not more than 35 feet long, and wooded four-fifths of its height. At its foot, to the W.N.W., is a small, shallow lake.† At two-thirds of the length of the island from the North rises the Peak *Do Centro*, and a little to the South of it that of *Dos Sulcados* (furrows), so called from its appearance. Around the base of these mountains a narrow plain encircles the island, and is covered with cocoa-nuts and plantains. Otherwise, the island is thickly wooded throughout.

Point Esteves is the N.W. point of the island, and consists of rocky cliffs, which extend as far as *Pt. do Ilheo*, two-thirds of a mile to the N.E., and then commences a sandy shore, reaching to the North point of the island, *Pt. San Antonio.* From this to *Pyramid Point*, one-third of a mile S.E. by S., the beach is still sandy, and between them is the village of *San Antonio da Pruia*, the capital of this island. It is built on the beach, amid a grove of a cocoa-nut trees. The houses are miserable, small, and rudely constructed of rough hewn planks and mud. It contains 400 or 500 inhabitants. Pyramid Point is sandy, and is very remarkable by a large number of black rocks off it; one of these is very high, and gives name to the cape.

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ductions of a common and degenerate kind, and not abundant; and its inhabitants a most wretched people. Preceding descriptions of the island may have been overcharged in one way; but we are assured, by a respectable commander acquainted with the island, that this description is not less so in another. The bank is certainly narrow, and caution in anchoring is required; but to an experienced seaman it cannot be considered dangerous. It is clear, at least, that an ample supply of limes, oranges, bananas, plantains, and other refreshments may be readily and cheaply obtained here.

* For additional information as to Anno Bona, see a "Description of the Island, showing its Eligibility and Importance as an Occasional Place of Resort, with an Appendix on the Causes and Prevention of Sickness and Mortality among Seamen employed in the African Trade;" by Elliot Arthy, Surgeon, London, 1820. This little work, price only 2s., is well entitled to the notice of our readers. Here it is said that ships, which may visit St. Thomas's or Prince's Islands, are required to pay 84 ackies, or the sum of £21 sterling, for custom and harbour dues; and a further duty of 10 per cent. on all goods that are landed. The air about them, moreover, is very injurious to strangers.

† Description by the officers attached to Captain Owen's Expedition.

The directions for anchorage by Commander W. B. Oliver are as follows :—Open the low rocky point to the westward of Pyramid Rock, with the East end of the church (the eastern building detached from the village) ; you may then, by keeping Pyramid Rock on with a high rock over it, resembling a fort, steer in on that line, and carry sandy bottom from 19 to 3½ fathoms, within 2 cables' lengths of the beach, when Islet Point will bear W. ½ N., and the Pyramid Rock S.E. by S., and Turtle Island S.E. by E.

Ponta Pedrinha, a rocky cliff, is S.E. by S. ½ S. of the former ; and at one-third of a miles S. by E. from it is *Pta. d'Agoa*, near which is a rivulet of very difficult access. At above a mile southward of this is an islet of very singular form, called *Ilheo Da Tartaruga*, or Turtle Island. It is in lat. 1° 24′ 18″ S., long. 5° 38′ 10″ E. ; variation 21° 0′ W.

All the West coast of Anno Bona is safe and steep-to, but affords no shelter to shipping.

The *Currents* around Anno Bona are very variable ; nevertheless the island seems to lie in the Equatorial Current, which, to the West of the island, runs to W.N.W. with varying rate. In April and June it runs from 15, 17, to 24 miles in the twenty-four hours. To the South of the island they sometimes run to W.N.W. ; at others, North and N.N.W., and even N.N.E. To the East of the island they are often running to North, N.N.E., and even N.E. Hence it may be said that, during calms, the anchorages of this island are difficult to make. To the North and West of Anno Bona the Equatorial Current is almost constant.

SECTION VII.

THE COAST OF AFRICA, FROM CAPE LOPEZ TO THE CAPE OF GOOD HOPE.

The seasons, &c., of Congo are briefly described by Lieut. Bold on a previous page; and as every information is desirable on a coast so little known as that under consideration, the following observations, by Captain H. J. Matson, R.N., will be acceptable:—

*Seasons.**—On the West coast of Africa, South of the Equator, the rains generally begin early in November, and continue until the middle of April. They are earlier on the coasts of Angola and Benguela, and later to the northward of Congo. To the southward of 10° S. there is occasonally not any rain whatever for several years; but sometimes in the months of November and December it falls in excessive quantities, and the country then becomes in parts almost inundated. There was not any rain near Benguela during the years 1840, 41, and 42; but the appearance of immense watercourses, in which were large trees that must have been carried by the torrents many miles from the interior, amply corroborate this statement.

About Kabenda and Malemba (lat. 5° 30′ S.) the rains are very heavy from the beginning of December until the middle of January. To the southward of 10° S. the months of January and February are very fine, but oppressively hot and sultry.

The months of March and April are the most unhealthy. This is owing to the exhalations from the earth after the heavy rains, which the light sea breezes are not sufficient to dispel.

From May to September are the most pleasant and healthy months; the sky at this time is generally overcast or cloudy; in the months of June, July, and August a thick fog (called the "smokes") prevails; it is not caused by exhalations, and is neither unwholesome nor unpleasant. Tornadoes occur in September and October; they generally blow from S.E., and are not nearly so violent as those to the northward of the Equator, nor are they usually accompanied with heavy rain.

Winds.—From Cape Voltas to Cape Negro the wind blows constantly from South, a double-reefed topsail breeze. From Cape Negro to Salinas it continues to blow up the coast from S.S.W.; it becomes more moderate as you get to the northward, and when to the northward of Cape Mary it frequently blows from S.W. and W.S.W.

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* Captain Ch. Ph. de Kerhallet says:—"One general remark to be made on the seasons of this portion of the coast is, that the more you advance southward the more backward they are.

"Every time the sun, in its alternate passage from one hemisphere to the other, is in the zenith of a place, this period is generally that of the bad season, of rains, and squalls, and storms. In places near the Equator, these passages happening every six months, there may be reckoned two rainy seasons and two dry seasons; the former, when the sun is in the zenith of the place; the latter, when it is at its greatest distance from the Equator, North or South. But this rule is not to be considered absolute, for in the parts near the Equator what may be called the dry season is that in which the rains are not heavy or continual, and that in which you are subject to storms and tornadoes has its intervals of fine weather.

Between Salinas and the River Congo the prevailing winds are S.W. throughout the year. The sea breeze generally sets in about 1h p.m. from W.S.W.; it gradually veers to the southward, and continues to blow from S.S.W. or South during greater part of the night, and becomes very light or calm before daylight. When within 10 or 15 miles of the shore, the land breeze will reach you, and continue sometime from sunrise until 8h or 9h a.m.; but if 30 or 40 miles off shore, you will generally have a calm from sunrise until noon. The sea breeze occasionally sets in from W.N.W. and N.W.; and this happens more frequently in the months of October, November, and December. During the "smokes" (in June, July, and August), the winds are very light, and blow from South and S.S.E. during the whole twenty-four hours.

At the distance of 80 or 100 miles off shore, the S.W. winds become more regular; they gradually veer round to the southward and eastward, and imperceptibly unite with the S.E. trade. A line drawn from the Tropic of Capricorn, in long. 5° East, to the meridian of Greenwich, in lat. 5° South, may be considered as the eastern limit of the S.E. trade.

From the River Congo to Cape Lopez the land and sea breezes are not so regular. From October to April the winds here are always constantly from S.S.W. and S.W.: and heavy squalls from S.W. and West occur in December and January. From May to September the land and sea breezes are more regular; the latter at this time often set in from W.N.W., and blow during the night from S.W. and S.S.W.; and then the land breeze is only felt close to shore.

Currents.—A current is almost constantly running up the coast of Africa from the Cape of Good Hope to the River Congo, at the average rate of 1 mile per hour. It is here met by the impetuous stream of that river, which runs with undeviating regularity to the N.W. and N.N.W. at the rate of from 2 to 4 miles in the hour, until it unites with the Equatorial current, 2° or 3° South of the Equator. The stream of the Congo is felt at the distance of 300 miles from its entrance, and may be known by the clayey appearance of its waters, which are of a yellowish olive green colour. From May to October the current occasionally runs to the southward, *close to the shore,* and continues to do so for forty-eight hours.

Rollers or *Calêma.*—A day or two after the new moon, in the months from May to September, a very heavy swell sometimes sets in along the whole coast from 3° to 15° South; this occurs more frequently during the smokes. It renders the open bays very dangerous to remain at anchor in where the water is very shallow. At this time it is nearly a calm, never more than a very light breeze; you can easily warp outside of the heavier rollers by a small hawser; or you can ride by a kedge anchor and hawser, when the chain cable would snap with jerks, caused by the sudden influx of a large body of water into the bay. During the period of calêma you cannot land on the coast, except in the surf boats.

BANK OF SOUNDINGS.*—From Cape Lopez, the boundary line of the bank of soundings, *i.e.*, where there are 55 fathoms (100 metres), gradually becomes more distant from the shore, as you go southward, as far as the right bank of the mouth of the River Congo. Off Cape Lopez it is about 8 or 10 miles out, and these deep soundings may be found close to the Cape and to the West of it.

Near the River Fernan Vas it extends much further, and attains a breadth of 25 or 28 miles, which it keeps as far as Point Sta. Catherina. From this point the line of soundings of 55 fathoms (100 metres) retreats from the coast; and on the parallel of Pt. Pedras it is 48 miles out.

The coast from Point Pedras runs to the S.E., and it seems that the boundary line of the bank runs parallel with it, until, off the Bay of Loango, 60 fathoms are found 50 or 55 miles out.

The prevailing nature of the bank is of mud near the shore, as far as 10 or 11 fathoms; further out is found grey or muddy sand, sometimes sand and gravel, and sand mixed with coral. This last kind of bottom is found more in the neighbourhood of the River Congo.

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* Remarks by Captain Ch. Ph. de Kerhallet.

It is only in some places, as near Point Pedras, that the bottom is rocky. The rocks are always a short distance from the coast, to which a good berth should always be given when you come upon this kind of bottom.

Throughout the whole extent of the bank of soundings the water shoals very gradually from the West towards the shore. We have stated elsewhere the law which seems to regulate this, and which renders the navigation safe. Vessels can generally coast along 2 miles from land without fear of danger. Moreover, you can anchor on it anywhere, in any depth you choose.

The previous remarks will readily suggest what course you should take when sailing along this coast from North to South. So that, except when it is setting to the S.W., you should invariably keep out at sea beyond the influence of the current, and not come near the shore, except to take advantage of the land breezes which begin to blow about sunrise, or a few hours before. In a word, you must shape your course just as in the case of the Senegambia coast, when running to the North in the fine season.

The land breezes are usually not very strong, and are not felt more than 20 or 25 miles out.

The tornadoes on the Loango Coast are not so violent as those in the Gulf of Biafra or the Gulf of Guinea. They are usually violent storms, during which the winds blow from the East or S.E., and then gradually losing their force, recommence blowing from S.W., turning by the South. But still there are sometimes hurricanes from the East and S.E. of considerable violence, which compel you to take in all sail. But these squalls and storms are invariably so long gathering in the East and S.E. that you have plenty of time to prepare for them.

It is about the parallel of the River Congo that these tornadoes cease to be felt.

After this the navigation of the Loango Coast is found not to be dangerous, and it is very easy when sailing from South to North; only, in making the bays on this coast, you should always keep clear of the S.W. headlands of these bays, which are almost all skirted by banks of black rocks, although the points themselves appear to be of sand, which is probably only a covering on the surface.

On the whole of the coast we have been describing, except in the bays where landing is very easy, communication with the land is very difficult, and frequently very dangerous and impracticable for small boats, on account of the heavy surf which breaks upon the beach. It is therefore very useful to have here, as well as North of the Equator, some canoes or boats on purpose to clear these breakers, manned by blacks accustomed to manage them.

On the Coast of Loango, as we have said, the alternations of the land and sea breezes are not very regular except during the months of May, June, July, August and September. In the other months the prevalent breeze from West to South varies very little from this direction.

In the season of the *rollers*, and especially at the period of the syzigies, you should avoid anchoring in shoal water, or if you do, be prepared to get away from the land at the first indication of danger. The rollers announce themselves by considerable surf; the sea breaks on the headlands of the bays before you perceive any swell inside; and from the mast-head there may be seen large waves out at sea occasioned by them, which look like ridges on the surface of the water.

CAPE LOPEZ, or Lopo Goncalves, the point of which is given as in lat. 0° 36′ S., long. 8° 43′, has been described in the preceding section. Between this point and what is called by Owen the outlet of the *River Mexias*, 7 leagues to the southward, the coast is altogether clean, and you may sail along it, without fear, in 7, 6, and 5 fathoms of water. The anchoring-place, off the entrance of the River, is in 5, 4, and

3 fathoms; but you have to avoid a reef, which stretches from the South point, halfway over the channel. The river does not appear fit for ships. From the River Mexias to that of Fernand Vaz the course and distance are S. ½ E. (*S.S.E. ¼ E.*) 22 miles.

The RIVER FERNAND VAZ, in its lower course, forms a portion of the delta of the great river Ogobai, previously mentioned, and runs parallel with the coast for at least 40 miles. Until the publication of M. P. B. Du Chaillu's interesting travels, it was but little known to the rest of the world. But the exploits of that intrepid traveller, and from his having discovered here and first made known to science the habits and true character of the *gorilla*, the nearest approach to man in the animal creation, have invested this locality with a far greater interest than its commercial importance would give it.*

The river and the low land hereabout are very changeable, so that no specific description will be long correct.

M. Du Chaillu, on arriving here on his second journey. Oct. 8, 1863, says:—

The part of the African coast in the neighbourhood of the mouth of the Fernand Vaz has a monotonous aspect as viewed from the sea. A long line of country, elevated only a few feet above the sea-level, stretches away towards the South, diversified here and there by groups of trees, and enlivened only at intervals of a few miles by a cluster of palm-clad huts of the natives, amongst which is always conspicuous the big house which the villagers construct for the "factory" that they are always expecting to be established at their village. The mouth of the river itself is very difficult to discover. In my former journey it was recognizable only by the white surf which foamed over its bar, and by the flocks of fish-eating birds hovering in the air above it. The bar, however, seemed now to have shifted, for we passed by it without perceiving it.

Although I had been absent only four years—years so full of events to me!—time had wrought great changes in the scene of my former adventures. The mouth of the river had altered so much that I scarcely knew it again. The long, sandy, reed-covered spit, which formerly projected three miles from the southern point of the river's mouth, had disappeared, and the sea had washed up the sand so much on the northern side that the village of Elindé, whose chief, Sangala, had given me so much trouble in former times, had become untenantable, and the people had removed. Many little islands had also been submerged or washed away, and I no longer saw those flocks of sea birds which formerly frequented the locality. Paddling up the stream we came to my own settlement, which I had called Washington; it was deserted and in ruins, a few loose bamboos and rotting poles alone remained to show me where it stood.

In 1863 Lieutenant Carpentier, of the French Marine, in the *Arabe*, entered and ascended the stream, making a slight survey of it, but, as has been before remarked, this can be of little permanent service. The following extract from his report will suffice:—

The coast is entirely formed of mangroves, and is so uniform that it is impossible to perceive any indication of the entrance from the offing. When within a mile, and in depths of less than 4 fathoms, the northern entrance, in lat. 1° 15′ S., may be made out. The North point is a moderately high sand-bank, and may be doubled to the southward at 600 yards in a depth of 12 feet, the least water found by Lieut. Carpentier in Jan., 1862. When abreast of the breakers on the South point bear round to the South, keeping on the East shore, and the depth will increase immediately. As soon as the South breakers bear West you can keep the middle of the stream safely. With care it may be followed for about 5½ miles to the southward, when a second entrance will be reached. This has but 6 feet at low water, and here the river itself is barred with only that depth in the passage, so that any vessel of greater draught will have to await the rising tide.

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* M. Paul B. Du Chaillu had resided with his father for several years on the Gaboon and in this region, and on his return to America and Europe published a most interesting account of the country, and especially of the Gorilla, the gigantic ape of which almost nothing but vague report had reached the *savans* of Europe. This work, "Explorations and Adventures in Equatorial Africa, London, 1861," excited some controversy in the scientific world, as is well known. This led the brave traveller to venture again into the same field. The expedition was accidentally brought to an abrupt termination, and the results are embodied in his second work, "A Journey to Ashango Land," 1867. This has fully established the fame and credit of the author. In addition to these works, that of Mr. W. Winwoode Reade entitled "Savage Africa," will be read with great interest.

From this second bar to the entrance of the lagoon, in which stands *Lawlin Island*, the channel keeps on the West side, but as soon as the lagoon is opened pass over to the eastern side, and steer so as to pass close to and between two small grassy islets; thence make for a bluff point of trees, which stands just to the North of the northernmost factory, that of Mr. Walker, after passing which the New York factory, the barracoon of Mr. Lawlin, will be seen. The banks are here very steep-to.

The river here expands into a large lake, and above this again contracts, and is limited by wooded hills, and changes its name to *Rembo*, meaning *the river*.

From its flowing through the country of the *Camma*, or, as M. Du Chaillu terms them, the *Commi* tribes, this southern portion of the stream has been called in the charts the Camma River, but it is the same as the Fernand Vaz.

The Ogowai or **Ogo-bai River**, previously mentioned, enters the Fernand Vaz at about 7 miles from its mouth, and forms a network of channels, lined with mangrove swamps. Next to the Congo it is the largest stream in this part of Equatorial Africa.

Sailing southward from the mouth of the Fernand Vaz the "islands" of trees on the sandy shore become larger, and unite to form a considerable forest toward Cape Sta. Catherina, where, between the river and the sea, is the inhospitable jungle which forms the principal home of the gorilla hunted by Du Chaillu.

At the distance of 24 miles S. ¼ E. from the River Fernand Vaz the coast forms a slight indentation or bay, called on the charts *Camma Bay*. Its North point is called *Point Metoutou*. It is 10 miles from the South point of the same bay, called *Point Sta. Catharina*. Point Metoutou is wooded, and projects very slightly beyond the coast line. At 2 miles North of it is seen the little *River Paradia;* and between this river and the point, but situated rather inland, is a clump of trees higher than those surrounding them. In Camma Bay the trees grow to the water's edge. There are several villages to be seen.

Point Sta. Catharina, coming from the North, appears a clump of lofty trees, which look as if they were separated from the main land, and give the appearance of an island; coming towards it from the South, the shore looks craggy. Around the Point there is a reef of rocks and sand, extending 3 miles towards the North, where there are 6 fathoms of water.

Some hills of slight elevation at the South of the point give the coast a bold appearance. Above the beach the land rises gently, the belt of trees and the drowned lands disappear, and here and there are seen open spaces, which show some vegetation, and give the country, at a distance, a cultivated aspect. This is frequently the case on this coast as far as Cabenda.

From Point Sta. Catharina to Point Pedras the coast runs S. by E. ¼ E., for a distance of 63 miles, with several slight indentations, in one of which, towards the West, is the mouth of the River Setté. It is low between these two points, with sometimes a narrow sandy beach, and sometimes covered with trees down to the water's edge. Between Point Sta. Catharina and the River Setté there are several watercourses, indicated by narrow cuttings in the belt of trees on the shore, principally to the North of the River Setté, near to which the sandy beach reappears. Some higher hills also begin to be seen inland, forming a chain parallel with the beach. And here, in clear weather, the land may be seen from the mast-head, when in 35 fathoms, or from about 18 or 20 miles from shore.

The RIVER SETTE is the northern boundary of the kingdom of Loango. It is a fine stream, with a depth of 3 fathoms at its entrance. The points at the mouth of it are about 1¼ mile apart, and are low and covered with tall trees, as well as its banks, which renders it very difficult to distinguish the river. It runs at first in an easterly direction, and then E.N.E. The town of *Setté* is built 50 miles inland, on the right bank of the river; it is the capital of the territory of the same name, the inhabitants of which formerly carried on a considerable trade with the Portuguese in red wood and ivory.

The entrance channel of the Setté is only two-thirds of a mile in width. It is formed by a wooded bank on the North, and on the South by a sand-bank, which, after stretching westward for about a mile along the South side of the river, continues round the southern point at a short distance, and extends itself up the river. The course of the channel is very nearly N.E.; near its mouth the river separates into two streams, the one running to the North, the other, which is the principal one, towards the East; it is on the latter that the town of Setté is situated. It is said that this river deepens after passing the bar. There is a small conical wooded hill at the point where the river divides, which may also serve to distinguish it. The River Setté rises in the mountains of *Camplida*, and it is said to be 260 miles long.

From the River Setté the coast is low and woody for 15 miles; and then begins the chains of Santo Espirito hills, which are the best marks for recognizing the River Setté and Point Piedras, which latter is 9 miles South of these hills.

The *Santo Espirito hills* stand back some miles in the interior. They form two remarkable patches of table land covered with trees, flat at the top, and separated by a valley, at the bottom of which there appears to be a river running. "They are (says Mr. Woodville) beautifully ornamented with trees, and a vista in the middle." Pimentel describes them as two high mountains, flat at the top, which, lowering regularly on each side, unite equally with the ground. On the South side of these hills, some spots, apparently grassy, are seen, which, when you come near the coast, in 11 or 10 fathoms, appear quite barren. You ought not to come to an anchor, nor go nearer the shore than 9 or 8 fathoms, the bottom being full of sharp stones. So long as you find good ground, you may approach the land; but so soon as it becomes rocky, stand to seaward. There is great fishing on all this coast, chiefly for pargos or rocket fish.

Upon this coast, in general, the winds, during the fine weather, are from the S.W. These set in after noon, with land breezes from the N.E. early in the morning; but during the rains and winter months the winds are from the southward, with little or no land breeze. In the vicinity of the land the current runs with rapidity, and the coast therefore should be approached with due caution.

The shore is indented in many places between the Setté and Point Piedras by several streams.

The shore must not be approached in this part in soundings of less than 8 or 9 fathoms, which are found 3 miles off, as within that the bottom is very rocky, and many of them have sharp tops. When, however, a sandy bottom is found, the land may be neared; but as soon as it becomes rocky, it must be left. Close in-shore there is abundance of fish, and fishing is an usual resource of the crews.

To the South of the Santo Espirito hills there may be seen, when near the shore in soundings of 10 or 11 fathoms, some of those spacious clearances, of which we have already spoken, and which give to the country the appearance of being cultivated.

Point Piedras is low, woody, and very difficult to make out, when seen from the West. It is more distinct from the South side, and projects about a mile beyond the line of coast. It forms the right bank of a river, the estuary of which runs from S.W. to N.E., and which soon after turns sharply round to the S.E., rounding the Santo Espirito hills on the South. Point Piedras is prolonged to the S.W. by a bank of rocks and sand, about 2 miles in extent, to which it probably owes its name. The Portuguese call it Cabo Primeiro.

From Point Piedras to Cape Yumba the coast runs to the S.E. by S. for 54 miles. Its appearance on leaving Point Piedras is very varied. It shows at its foot a narrow sandy beach, covered at its top with thick mangroves. This sandy beach is not visible 6 miles off. A lofty range of hills, with rounded summits, is seen some distance in the interior. In many places the coast appears in three ranges or levels. In the ports South of Point Piedras, the first level is formed of mangroves rising from the water's edge; the second, of tall trees, rather more inland; above which, the third, rise the heights before spoken of. Here and there some bare spaces, covered only with dry grass, make whitish spots amongst the verdure of the second range. But on nearing Cape Yumba, the aspect of the coast is different. A white sandy beach forms the shore. From Point Piedras the coast rises gradually towards Cape Yumba, and the hills are close to the shore. The bank of soundings also increases in width. Seven or eight miles off there are 22 fathoms of water, with a bottom of muddy sand. In 36 fathoms the land is not visible, and the colour of the water indicates the bank of soundings. The coast is clean and steep-to, and may be approached within 2 miles without danger, in 7, 9, and 10 fathoms.

A little to the South of Point Piedras, among the trees which cover the shore, some houses or barracoons are seen, with various flags hoisted. A little further there are some more houses, with red and white striped flags, which are also places for trade.

Fifteen miles from Port Piedras there are two white spots on the inner range with those before mentioned. At 34 miles from Point Piedras the country inland appears hilly, and increasing in height as you proceed southward.

These hills may be seen 25 or 30 miles out at sea. The hills on the shore are a range which is formed from old sand dunes, the surface of which has become hardened by the alternate effects of heat and rain. Between these parallel ranges there are lakes and marshes, as also between the first range of hills and the shore in many places. At about 20 miles North of Cape Yumba is a very remarkable isolated conical mountain.

Cape Yumba.—Coming from the North, Cape Yumba may be recognized by three or four undulating or saddle-shaped hills, skirting the shore, and falling abruptly to the sea, to the very point of the cape, on which are some clusters of trees. They are called the *High Land of Yumba*. Five miles off the cape there are 13 fathoms, bottom of sand and gravel.

At the foot of this high ground, which forms the cape, there is a rock or small islet joined to the land, to the South of which is a creek, in which you may land. To the South of Cape Yumba there is a river, which divides a short distance from its mouth, called the *Yumba River*. It waters the Yumba province of the kingdom of Loango. It is said to be 100 miles long.

Cape Yumba is the North point of Yumba Bay, the South point of which is called Point Matooti. Its foot is surrounded by a rocky bank, extending to the S.W. for about a mile.

Point Matooti, which the Portuguese call *Cabo Segundo*, lies 9 miles S. by E. ¼ E. of Cape Yumba. To the East of this point, which is low at its extremity, there is a hill covered with trees, at the foot of which the river *Matambi* runs parallel with the shore for several miles towards the South. Point Matooti is skirted on the N.W. by a ledge of rocks, above and under water, for about a mile. Those which are visible are rough black rocks, extending for half a mile N.W. from the point.

YUMBA BAY.*—Between the points, 7½ or 8 miles apart, Yumba Bay describes a tolerably regular curve, with a fine sandy beach. Some hills line its inner part, rising from the inner shore. They are lofty, especially in the South, and well wooded.

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* *Yumba* is the name of that part of the kingdom of Loango in which the bay is situated. *Ma-Yumba* signifies King of Yumba. Yumba Bay is called by the Portuguese Alvaro-Martinho.

The South side of the bay is formed by a tongue of low land, which begins from Point Matooti, and runs in a northerly direction for about 2 miles, then to the N.W. for a similar distance. The North shore of the bay runs about W.N.W. to Cape Yumba.

The extremity of this tongue of land, or peninsula, forms the point of the left bank of the mouth of a tolerably large river, named *Louziby*, which empties itself at the bottom of the Bay of Yumba, through a very narrow passage, barred by reefs, on which, at low water, there is not more than 8¾ feet of water. This river, which is very shallow, and has only 12 feet water in the large basin within its mouth, is said to have a course of 60 miles.

Into this basin, obstructed by banks and islands, the most remarkable of which are those of *Mavalaba* to the North, of *Great* and *Little Yatumba* to the South, there also runs in its North part the *River Comby*, on the right bank of which is a village of the same name; and in its South part the *River Matambi*, which runs parallel with the shore to the South. The best water is obtainable in the River Louziby. There are several villages on the coast, on the Yatumba Islands, and on the peninsula which encloses on the West side. On this peninsula are seen some Portuguese and Brasilian factories, and a large village near to Point Matooti.

The Bay of Yumba is safe, except at those points we have marked. In coming from the North it will be necessary to keep at least 2 miles to the S.W. of Cape Yumba; and in coming from the South keep 3 miles to the North of Point Matooti; but when once round the points, there is good anchorage all over the bay. The bottom is even, and shoals gently from the line of the two points.

Rather more than a mile from Point Matooti, to the N. ¼ W., there is a small island, called *George Islet*, about half a mile from the bottom of the bay. It appears to join the reef, and stretches along the N.W. of Point Matooti. This islet is about one-third of a mile from North to South, and is very narrow from East to West. It is skirted on its North point by a bank, with breakers, which extends about one-tenth of a mile. To the West of the islet, and close to it, there are 7 fathoms; to the North, 6 or 7 fathoms; in the East, 6 fathoms; and the depth gradually decreases to the beach, near to which are 3 fathoms.

The best anchorage, because the quietest, is to the East of George Island, in 6 fathoms, hard mud. You should go a little round the North of the island to get to it; or else anchor off the North point of the island in 8 fathoms, one-third of a mile distant. It is high water, at full and change, at $4^h 35^m$; the rise is 6 feet 10 inches.

Ships can anchor on the line between Cape Yumba and Point Matooti, in soundings varying from 8 to 10 fathoms, brown sand.

There is good shelter in the Bay of Yumba from the S.S.E. and South winds, but not so good from the S.W., except at the anchorage in the East of the reef and islet of St. George, which break the sea, and render the swell, which generally prevails in the bay, less troublesome.

Trade is carried on in the bay in ivory, wax, *gum*, dye-woods, but chiefly in slaves. Abundance of fish is found in the bay, especially shellfish. These, with yams, form the chief food of the inhabitants, who are very wretched. The chief town is on the peninsula, and may contain 1,000 people. All the country around is thickly wooded and low, and the inhabitants very poor.

An officer of the *Barracouta*, before quoted, observes that Yumba is now in a wretched state of poverty and dilapidation. He says that the anchorage is *not* good, as a heavy swell sets in when the wind blows on shore, and there is then no shelter unless by lying close in upon the southern side of the bay, which, from many reasons, is not advisable.

The Bay of Yumba may be regarded as being on the limits of the great rains. To the South of it the vegetation is not so vigorous; parched lands begin to appear, and naked hills, with their summits scorched by the heat of the sun, are seen. The coast indeed presents evident marks of drought, more or less intense; and these signs become more and more distinct on advancing southward.

From Point Matooti to Point Banda, the first projecting land to be met with, the sandy coast increases gradually, and at the foot of it is covered with trees. The first line of hills rises a short distance inland, and after that two other ranges within rise one above the other.

A bank here skirts the sandy beach, extending half a mile off; 9 miles from Point Matooti, a small island or large black rock shows itself on the bank, about 2 miles from the shore, which in this place is very remarkable. The heights, which come down to the shore here, are rugged, with broken peaks, and of a whitish hue. The trees which cover them are of a round form. Some rocks appear at the base of the hills, on the tops of which are single trees with tall stems, and some shady palm trees crown the base parts. Further on are some high peaks, a good way inland; more to the South the land reappears in three undulating ranges.

From Matooti Point to Banda Point the distance is 39 miles. The bottom near the latter is thickly studded with rocks and coral reefs, which extend 4½ miles N.W. in 20 fathoms. There is plenty of fish here, but the anchorage is very bad, and the coast should not be approached, even by the lead, on account of the irregular rocks.

Banda Point, which is low, may be recognised by two lofty hills, back in the third range, the summits of which are called *Paps of Banda*, from their form.

From Point Banda to Point Kilongo the bearing and distance are S.S.E. 30 miles; the shore between has all along its foot a thick belt of trees, and one or two ranges of hills some distance inland, but not so lofty as those before mentioned. Four rivers enter between these points; the most northerly of which appears to be the mouth of the *River Matambi*, which opens to the sea. We have already said that this river, emptying itself in the North into the basin of the River Louziby, situated at the bottom of Yumba Bay, ran parallel with the shore towards the South. The second river, the mouth of which is 14 miles from Banda, is called the Makanda. This river, with a village of the same name on its left bank, about 3 miles up, is the South boundary of the Yumba territory. Another small stream runs between the hills into the sea; and the fourth river is the *Kilongo*, 3 miles from Point Kilongo. It is said to be 30 miles long.

Point Kilongo is the South point of the small bay or creek in which the River Kilongo empties itself. This point is marked by a single hill with a flat top, situated on the left bank of the river's mouth, and by a reef which extends half a mile, which is the *Baxo do Indio* of Pimentel. There is tolerable anchorage in 4½ fathoms, reddish and mixed with shells, to the North of the reef, in the cove which lies opposite the entrance of the river. The land adjacent is moderately high, with several whitish patches. North of Kilongo Creek there is a large lake and a lofty mountain, with a peak or nib on its summit. The village of Kilongo is 3 miles inland, on the left bank of the river, in a park-like country.

From off the river Kilongo the depth appears to increase gradually from 7 fathoms at 3 miles, to 60 fathoms 40 miles out. The shore between Point Banda and Point Kilongo is clean, and may be passed at a distance of 3 miles, in 6 or 7 fathoms. The bottom in the offing is for the most part muddy.

From the Cove of Kilongo to the River Quiloo, or Killoo, the course is S.E. by S. (*S.E. by E.*) 31 miles. "The land to the southward of the cove," says Pimentel, "is tolerably even, with some hillocks and lofty trees further in, which terminate at a pretty high mountain, called by the negroes Salomba. The coast, for the space of 4 leagues, appears white at a distance, with sandy downs, and has some palm trees. The bottom, along shore, is sand and stone, so that you ought not to approach the land nearer than 9 fathoms; this foul ground continues as far as the River Q'art. On the North side of the entrance of the river are two small woody eminences, called by some navigators, the *Paps*. You can land here in boats only, as a bank of stones and sand exists, on which are only 2 fathoms of water."

This part of the coast between Point Kilongo and the Killoo is not safe. The bottom is sand and rocks, and the shore must not be approached nearer than in 9 fathoms. Further out, in 11 or 12 fathoms, there is soft mud.

The River Killoo appears rather a large stream. It runs across a very flat country, towards the E.N.E., for 27 miles from its mouth. At this point it divides into two branches, the one running to the N.E., the other S.E. On the latter are the villages of *Kibota* on its right bank, and of *Bando* on the left. The entrance to the river appears to be barred by a reef of sand and rocks, on which there are only about 12 feet of water. It is not, therefore, practicable except for boats.

The South point of the mouth of the River Killoo is called Kisanga. It is wooded and rather elevated, as well as the North point, and may be considered as the North point of the Bay of Loango.

LOANGO BAY.—From Point Kisanga the coast, with a sandy beach, runs southward, curving in and out, for about 4 miles; then to the S.W., and forms the S.W. point of Longo Bay, called *India Point.* From Point Kisanga the coast rises again, and shows a range of hills above a sandy beach covered with a bank of thick trees.

A little to the North of Loango Bay, two distinct ranges of hills, with bare summits, exhibiting only a few lines of verdure, separated by a short interval from each other, runs towards the bay. They are very steep on the shore side, and are of a bright red colour. The green lines separating the naked parts, and dotted with palm trees, exactly resemble hedges between cultivated fields.

The land at the bottom of the bay, seen from a distance of 3½ miles, shows a thick line of trees round the beach. Above this uniform line, in the North, and some distance behind in the interior, is seen a mountain, flat at the top, with rounded ends, which are very precipitous. A little to the South is seen another long continuous chain of hills, which decrease in height towards the South.

Indian Point, at the S.W. of Loango Bay, which, according to M. Kerhallet, is in lat. 4° 40′ S., long. 11° 42′ 4″ E., is low and wooded at its extremity. But a little inland it rises, and shows some barren hills of a red tinge, overhanging some ravines which are covered with vegetation. Their appearance is very striking from the South. This point is prolonged by a bank, called *Indian Bar*. which reaches more than half a mile to westward, but in the N.W. and North extends 2½ miles. When the sea is at all rough, it breaks on the bank for a mile out. Indian Point and Bay are most dangerous, and are still extending to the northward.

At the bottom of the bay, one large hut, easily distinguishable, is built close to the shore. It is three-quarters of a mile N.W. of a rivulet of fresh water, which, after running parallel with the beach for three-quarters of a mile, only separated from the sea by a narrow strip of sand, flows into the sea about a mile from Indian Point. The water of this stream is bad, and it is better to get it from another brook about half a mile North of the hut we have mentioned. In landing, get behind Indian Bar, and land on the spit, and not in the small river if there is any swell.—(*Captain R. F. Burton.*)

LOANGO.—The town of Booali, or Loango, the capital of the kingdom of Loango, lies 5 miles from the shore inland, and 15 miles North of Point Indian. A little more to the South is the village of *Kinpookoo,* more South still, 3 miles inward from the centre of the bay, is a place called Looboo, set apart as a burial place of the princes of the blood. This spot may be known out at sea by a clump of thick bushes on the top of the heights, called the *Wood of Looboo.* It is said that gorillas formerly existed in this wood. A little more South still, and 5 miles inland, is the burial ground

The kings of Loango, called *Loanghilli*, situated on the right bank of the stream which runs into the bay in the South. The factories are not seen from the bay; they are built in the ravine between the hills in the first range; to get to them you must land near the hut on the shore, and then follow the path near it. There are two English factories at Loango, and several other Portuguese and Brasilian.

These factories are falling off in consequence of the failure of the supply of copper ore (malachite), which was a chief article. The natives will not take you inland, so that no farther views can be obtained.

This bay has been, and is, an active market for the slave trade. The two marks for distinguishing the Bay of Loango are, when coming from the North, the red hills we have mentioned, and from the South the Wood of Looboo. When coming from the North to the anchorage, keep the house on the shore S.E., and keep on with this bearing. By this means you avoid the reef off Indian Point, which is also called Indian Bar. The bottom shallows gradually towards the shore of the bay, so you may cast anchor in any depth you like. In the bay the depth varies from 9 fathoms, on the line between the two points, to 2 fathoms near the beach. The East of Indian Bar is very steep, and the depth varies from 2 to 7 or 8 fathoms near its N.E. end. When entering the bay from seaward, keep Looboo Wood bearing S. 82° E., and steer right for it with this bearing.

The bank of soundings appears to extend for a long distance off the centre of Loango Bay. Thus, 5 miles West of the line joining the two points there are 12 fathoms, mud; 14 miles, 18 fathoms; 22 miles, 32 fathoms; and thus increases to 60 fathoms at 50 miles out.

The anchorage most convenient for entering is to bring Indian Point to bear South, and the hut on the shore S.E. by S.; you will then be in 4 fathoms, reddish brown mud; the usual bottom of the bay being this, with sand and shells, or sand and coral. It is excellent holding ground.

It is prudent, in the stormy season, which begins in October, to anchor at the place indicated; for the squalls, which are sometimes very violent, generally come from the East, and you should not come too near the Indian Bar, on which the vessel would be driven, if she should drag the anchors. There is otherwise no chance of this if the cables are good, since the holding is excellent, and there is never any swell. It is best in this anchorage to moor North and South; though convenient for watering, it becomes dangerous with rollers; so that on the first appearance of them the ship must be got under way, or be towed out to sea.

We have said that good water may be got from the brook North of the hut on the beach. But if you remain 24 hours in the bay, you will be able to get from the inhabitants fowls, pigs, goats, vegetables, bananas, and gourds; they may be got in exchange for merchandise or dollars, the coin best known by the natives, who are great thieves, but otherwise inoffensive. The regular trade is chiefly in ivory, which is very abundant.

The town is large, with broad regular streets, which are kept clean and in good order, and planted at each side with trees. There are great numbers of huts built so as to form squares; some of the barracoons, or buildings, are large, as if designed for factories, or peradventure to afford accommodation to slave-dealers, The palace of the sovereign is not one of any great importance, although he possesses some furniture and even plate.*

Captain Owen says, that Loango Bay affords excellent shelter to small vessels; and even for large ones it is preferable to Kabenda, which is 19 leagues more to the southward. The scenery is likewise more varied and interesting, although the dwellings of the inhabitants are, according to the custom of the country, not visible from the sea, being hid in luxuriant low lands; a custom which doubtless has had its origin from the system of kidnapping so much practised by the Portuguese.

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* Six Years of a Traveller's Life in Western Africa, by Fr. Travassos Valdez, London, 1861, Vol. ii., p. 69.

The natives were very friendly. Numerous lagoons exist at about 200 feet from the sea, extending parallel with the shore, and communicating with the beach in various places by drains or small creeks.

The tide rises 6½ feet in the bay, and the establishment of the port is at 4^h 30^m. The ebb tide runs out of the bay very fast, especially in spring tides.

Black Point Bay.—Indian Point is the North point of another bay, still safer and better sheltered than that of Loango; it is called Black Point Bay, from the name of its South point. South of Indian Point the sandy beach reappears; and between the hills and the sea is a beautiful plain covered with tall trees of dark foliage.

The land is moderately high, fertile in appearance, and well cultivated, with hills and valleys, then a line of downs, on which are here and there some very picturesque woods. South of the bay, these trees come down to the beach, and form a low, dark headland, thence called Black Point. It is the South extremity of Black Point Bay. At the bottom of the bay the plain is 3 miles wide, and looks very pleasant.

Black Point, in lat. 4° 49′ S., long. 11° 45′ 22″ E., lies 9 miles S. ¼ E. from Indian Point. A bank, which does not always break, but generally shows, runs along the N.W. of Black Point for about a mile, and for two-thirds of a mile to the West. Therefore, when coming in to anchor, a wide berth of 2 miles must be given to this point. This bank is very steep-to; in the North part of it there are from 8 to 10 fathoms, which decrease regularly.

The soundings in the bay are very regular, and diminish gradually, from 10 fathoms on the line between Indian and Black Points to the shore.

From Black Point the coast within the bay trends round to the East for about a mile, forming a low, sandy, narrow peninsula. This peninsula, running parallel with the shore at the bottom of the bay, forms, also, a sort of inner bay, with a narrow entrance, between the East coast of the bay and the prominent extremity of the peninsula. This second bay is open only to the East, with a depth of 12 or 13 feet. The extremity of the peninsula is called *Sandy Point.* A lagoon and a village are situated at the bottom of this second bay.

In standing into Black Point Bay from seaward, there will be seen, among the other trees which crown the hills, the clump of bushes, or Looboo Wood, of which we have spoken before. When it bears N.E., then make directly for it, and so avoid the bank on the N.W. of Black Point. The depth, on this track, decreases gradually from 18 to 4 or 5 fathoms, where the anchor may be dropped, if thought convenient. Or, as the depth decreases gradually, you can anchor anywhere in the bay, according to the vessel's draught of water. One of the best anchorages is on the line of Sandy Point, near the village, keeping it South, and Black Point W.S.W.; where there are 5 fathoms something less than a mile from the East shore of the bay.

But being so near the shore, in case of rollers setting in, we must repeat the remark we made in the case of the anchorage at Loango. Large ships also had better anchor with Black Point bearing S.W. ½ S., and Indian Point N. ½ W., 1 mile from the shore. There is a troublesome ground swell, but the holding is good.

When making for the bay from the South, care must be taken not to confound Black Point with another point some miles to the South, which very much resembles it. It is very necessary, therefore, to look out for the Looboo Wood, to determine exactly where the ship's place is. This second headland is called *False Black Point.* It is 6 miles South of the True Black Point; Looboo Wood cannot be seen till to the North of False Black Point, and hence the necessity for taking it as the mark. After running to the N.E. as far as where False Black Point can be clearly distinguished, the ship's head can be turned to the S.S.E. to get to the anchorage, going by the lead.

The landing is good in the creek on the North of the bay, and fresh water can easily be got there at a spring; sometimes, however, it is not plentiful. And, besides, the getting the water on board is a laborious work, because you cannot get near the watering place on account of the shallowness of the water in the creek, and so the water has to be carried in small casks. About a tun an hour can be got in this way.

The best and most abundant watering place is 2 miles South of this creek. It is a small lagoon fed by a spring about 45 yards from the beach, very near to which you can moor with a grapnel, if the swell be not too strong. There is a pathway to it, which, however, will have to be cleared of grass and brushwood to make it passable.

The position of the lagoon is 1¼ miles S. 60° E. of the anchorage ground indicated for large ships. Captain Mundy, of H.M. frigate *Iris*, put up a beacon to mark the spot.

Poultry can be obtained in this bay, and pigs, goats, vegetables, and some kinds of fruit in exchange for goods or dollars. The bay is an active mart for the slave trade.

LOUISA-LOANGO RIVER.—From Black Point the coast runs S. by E. ¼ E. for 18 miles, as far as the River Louisa-Loango, the northern boundary of the kingdom of Kacongo. It is moderately high, wooded, with a white sandy-beach, and some prominent undulations. It is safe, and very steep-to. Three miles out there are 7 and 9 fathoms, soft muddy bottom. The low woody country terminates at the Louisa-Loango River. Some breakers indicate the North point of the mouth of this river, which is of considerable length, and is said to run first to the East and then to the S.E. On the left bank, 40 miles up, is the town of *N'Singa*; and 58 miles up on the right bank is the town of *Kinghelé*. We have no information of interest about this river.

Kacongo Bay.—At 9 miles S. by E. is the River Kacongo. M. Kerhallet says: "The two rivers, Louisa-Loango and Kacongo, both run into one bay, which is called, we know not why, the Bay of Kacongo, and which we will call by this name to avoid confounding it with the bay South of Point Banda and North of Loango Bay." From the left bank of the River Louisa-Loango the land rises rapidly towards Kacongo Bay. The heights come right to the water's edge in the North and near to the Kacongo River.

The swelling hills are covered in places with dark coloured trees, which stand out very distinctly from the greenish grey herbage which grows where there are no trees. This first range of moderately high hills terminates at the right bank of Kacongo River. There the country is low for the space of 2 or 3 miles; and then, on the left bank of the river, the coast rises again, attains nearly the same elevation as before, and as far as Malemba the hills are of the same appearance as those on the North of the right bank; only they are more abrupt on the side towards the sea, which reaches to their foot, and are furrowed here and there by ravines down to the shore; they also show reddish patches in several places.

Kacongo Bay, which ought not to be so called, is a mere indentation of the coast, formed chiefly by the entrance to the Kacongo River, which appears to be a large stream. The sea is very much discoloured for a considerable distance, as far as where there are 17 or 19 fathoms, muddy bottom, 7 miles out. On the right bank of the Kacongo, which appears to run E.S.E. and S.E., stands the town of *Kaya*, 30 miles from its mouth, and 8 miles farther the town of *Boonia*. We know nothing about the entrance or the navigation of this fine stream.

From the South point of the mouth of Kacongo River the coast takes a S. by W. ¼ W., direction for 10 miles to Point Malemba, the S.W. point of the Bay of Malemba.

In this distance, two watercourses intersect the shore; the first, 3 miles South of Kacongo River; the second, at 6 miles.

Malemba, or Molembo.*—The country around Malemba is elevated like that we have just described, only the projections are more prominent, the ravines more declivitous; the sides towards the sea, which washes their foot, are so abrupt as to form rugged precipitous cliffs, covered with vegetation. The Bay of Malemba terminates in the S.W. by a point of the same name which is a headland projecting from this rugged tract. The effects of light and shade in these parts are very singular.

Point Malemba is formed by a tongue of land, of an even surface, covered with grass. It runs from the foot of the high cliffs, in a N. by W. ½ W. direction, into the sea. Viewed from its extremity. which shows at its base a reddish, ferruginous appearance, it descends in a long slope to the sea, and seems detached, by its dark shade from the less tinted land at the bottom of the bay.

The small but excellent Bay of Malemba is one of those indentations in the coast, of the form which is in some sort common to all the bays on the African coast, South of the Equator. They almost all penetrate in a S.E. direction, are open to the S.W., and sheltered on the West side by a bank or tongue of land, often level with the sea, stretching from the S.W. part of the bay some miles towards the N.W., and so protecting the anchorage ground from the swell of the sea and the prevailing winds. This almost universal form of the bays on the West Coast of Africa, South of the Equator, is owing most probably to the action of the swell from the South and S.W., combined with the prevalent current, which runs up the coast from South to North, and turns to the N.N.W. and N.W. This peculiar character of the bays often renders them very difficult of recognition when coming from the West, because then the banks which skirt the points from the S.W., not being distinctly visible out at sea, or being confounded with the land at the inner parts of the bays, are thought to be merely indentations in the shore, offering no shelter. This is the case in the appearance of the bay we are now describing.

Its S.W. point, Point Malemba, is prolonged seaward in a N.W. by N. direction by a bank, on which are 3 fathoms of water. This narrow bank, being less than a quarter of a mile wide, is 1¼ miles long from the point. It is formed of rocks, and on the top of one of them, four-fifths of a mile out from the point, there are only 16 feet of water. The sea breaks on the very foot of Point Malemba; and to the West of the point the bank extends three-quarters of a mile. This bank, which forms the West side of Malemba Bay, is not always visible. From Point Malemba, eastwards, the coast runs in, and forms, as in Black Point Bay, a prominent peninsula, parallel with the shore, from which it is distant about 170 yards. Its extent from Point Malemba is about half a mile. It is low and sandy.

The breadth of the Bay of Malemba, between the end of the bank and the shore, is nearly a mile, and diminishes gradually inwards.

Around the bank on Malemba Point, in its steepest part, there are 4, 4½, and 5 fathoms, with a bottom of sticky mud, like clay. In the bay the bottom is of the same character, and its usual depth varies from 4½ to 4 fathoms. At its entrance there are 5 and 6 fathoms water. It is here you must anchor, about 3 miles from the bottom of the bay, and 3 miles from Point Malemba, with the Point bearing S. by E. The red colour of the hills to the North of Malemba Bay, with the Point of Malemba itself is a good mark to recognize it by.

Opposite the bay, 3 miles inland, is the village of *Mayooba*; then farther South, on the parallel of Point Malemba, 7 miles up the country, is the village of Kilonga. It is this latter, no doubt, which has induced some navigators to give the name of Kilongo to the bay more to the North, which we have called Kacongo.

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* Valdez states that this territory, and that as far South as Angola, was ceded to the Portuguese Crown by the King of Molembo, on December 30th, 1854. But it is usually considered that the Portuguese territory of Angola is limited by the Rio Loze, in about lat. 7° 45′ S.—(See *Valdez*, vol. ii., pp. 70—72.)

Malemba Bay, excellent for small vessels, is not fit for those of greater draught; for these, being obliged to anchor a long distance out, are generally troubled with the heavy rolling sea. Rollers are frequent and very strong at this period, particularly at the time of full moon. They occur oftenest during calms. Thus, frequently even small vessels dare not anchor in the bay to the East of the bank on Point Malemba, for they find themselves, in storms, or during these tide races, in circumstances very similar to what we described in reference to the Bay of Loango, at the inner anchorage. On this account, therefore, ships which come to water prefer anchoring to the S.W. of Malemba Point, in 6 or 7 fathoms, mud, or in 7¾ fathoms, sand and gravel, at 2 miles from the shore, which is abrupt, and the beach very narrow. There is a fall of excellent water there.

You can land in small boats at the foot of Malemba Point, on the East side, when you want to go to the factories in the bay, which are built on the top of the shore, and are approachable by direct pathways. It is an active market for slaves.

A small rivulet runs at the bottom of the bay, of excellent water, which may be got without difficulty, and you can land on the beach, there being no tide races there.

Malemba may justly (says Captain Adams) be considered as the Montpelier of Western Africa.

The trading town of Malemba is under the command of a *Cheenoo*, or chief, who resides at *Chingélé*, or *Kinghélé* (before mentioned), about 18 or 20 leagues from the sea. It stands near the margin of a cliff that rises abruptly from the shore to an elevation of 100 feet, and is composed entirely of a dusky red argillaceous earth.

On gaining the summit of this cliff, an extensive and beautiful plain presents itself as far as the sight can reach, to the East and South. To the North the country is broken with the windings of the Kacongo River, the margins of which are finely wooded. The plain is covered with a luxuriant grass, and clumps of trees are scattered upon its surface, having the appearance of being planted by the hand of man, to afford him shelter from the sun and rain, and to adorn the landscape.

The climate of Malemba, in comparison with other parts of Africa, is very salubrious, owing to the dryness of the atmosphere an soil, and the absence of those deep forests so common in other districts; the Europeans trading here have, in consequence, almost uniformly enjoyed good health.

The natives are a mild, tractable, and inoffensive people, not at all warlike, but are said to be great thieves. They form a striking contrast to the people of the Gold Coast, who are turbulent in disposition, averse to innovation or improvement, and over whom the forts have not any control beyond the reach of their guns.

From the steep cliff which forms Point Malemba the coast runs about S. by E.; and nearly 5 miles from the point there is another, low, and rather prominent, which defines the end of the cliff. It is called Point Cascaes.

Point Cascaes.—The North point of the Bay of Kabenda is a seaward extension of a lofty hill of the same name. This mountain, which is a part of the general range differs from it in respect of its having no bluff projections. Seen from the North and the South, Point Cascaes is distinguished by a brighter colour from the land off which it projects.

South of this point the hills which lined the coast disappear, and there is a low plain which extends southward as far as the mouth of the *River Belé*, about 5 miles from Point Cascaes, in the Bay of Kabenda. There is a great number of palm trees in this plain, which is very wide, and runs to the East to the foot of some hills, which are very declivitous and abrupt on their West side.

The River Bele, about 6 miles N.E. from the S.W. point of the Bay of Kabenda.

is a small watercourse, bounding the territory of Kacongo on the South, and on the North that of *N'gayo,* which extends as far as the right bank of the River Congo (Rio Congo).

From the left bank of this River (Belé) runs a bank of sand and rocks, called *Bele Bank.* The extremity of the Bank has only 2¾ fathoms of water on it, but the sea does not break except with the ground swell or races. It extends in a West direction more than 2 miles, as far as the line between Point Malemba and the S.W. point of Kabenda Bay, called Point Palmas, or Kabenda Hook. To avoid it, from Point Cascaes you must keep 4 miles from the shore, or in soundings of not less than 8 fathoms, when you want to coast along to make Kabenda, or when you go out of the bay to the North.

From the anchorage at Malemba to the Bay of Kabenda the course is very nearly S. by W., and you must keep the lead going to be sure of the proper depth.

KABENDA, or Cabinda.—The extremity of Belé Bank lies N. by E. ½ E., 4½ miles from the town of Porto Rico, on the heights on the Bay of Kabenda. This town is also called Kabenda by some navigators. The Portuguese call it *Cabinda.*

The Bay of Kabenda is one of the most remarkable points in this part of the coast, because its population is more industrious and civilized than the people elsewhere, and also because it it is still a very active slave mart.

There is a great similarity between this tribe and the Kroomen, described of the Gold Coast. They row or paddle along, without intermission, under a vertical sun, singing their monotonous chants or songs, as may be witnessed in the war pinnaces which are sent out in those seas to capture slavers. They are very tenacious of their honourable name as good and experienced seamen, and receive as the greatest insult any expression that seems to suggest a doubt as to their excellence in this respect.

They are generally preferred by all as servants or hired people. Their pay is about 5d. per day. Provisions are now getting scarce here.—(*Captain R. F. Burton.*)

Kabenda Hook.—The S.W. point of Kabenda Bay is called Point Palmas, or Kabenda Hook. It is in lat. 5° 32′ N., long. 12° 5′ 22″ (Kerhallet). It is a tract low at its extremity, and covered with bushes, which rise gradually and become of moderate height some distance from its extreme end. Ou the highest part are some bushes, and there are bare patches between the shore and the summit. Some huts are visible at the North of the point.

A bank runs along Kabenda Hook on its W. and S.W. sides, on which the sea usually breaks; it does not extend more than 550 yards to the North. To the East of the point, and close to it, there are some rocks joining on to the shore. There is very convenient landing there. The coast then curves inwards, and presents a fine sandy beach, which describes a regular curve from North to East for about 1¼ mile, and then runs out again to the North.

The town of Porto Rico, or Kabenda, is very plainly seen from the North, and lies about half a mile from Point Palmas. The houses, with various flags upon them, are large and well built; footpaths lead from the sea side to the top of the hill where they stand.

About 1¼ miles from these are seen some huts standing on the left bank of a small stream, which is the watering place, and is called *Locola*; the water got there is not very good. Small vessels can enter the river.

The land at the bottom of the bay is tolerably high, a red bank, with low trees dotted over its cliffs, very pretty. Some of these cliffs are white, others red, like as seen in some parts of England. On these heights, and to the North of the watering place, are several villages, called *Vanaté.* More to the North is a point called *Umbrella Point,* rounded and sloping gently to the sea. This point is on the left bank of a small river, called *Lolondo.* The land then, winding to the North, gradually becomes very low in the neighbourhood of the River Belé. On the hills at the bottom of the bay, a little to the South of the River Lolondo, there may be noted some tall trees, covering their summit.

In approaching Kabenda from the northward, you should not haul in for the bay until Porto Rico bears to the eastward of South; and when approaching from the southward, not until Kabenda Point bears S.E. These two bearings will lead you clear of the Belé Bank in the North, and the shoals of Kabenda Hook to the South, and you may thus approach Kabenda Point, and anchor at any convenient distance. If desirous of entering the bay, or inner anchorage, you should bring Kabenda Point to bear S.S.E., or S.E. by S.; then steer directly for it, until you shoal your water to 3 fathoms; you may then steer along the South shore into the bay, giving Kabenda Point a berth of three-quarters of a mile. The best berth in the inner anchorage is with the Western Factory S.W.; Porto Rico, S. by W.; and the extreme point, W. ¾ N., in 3½ fathoms. There is also good anchorage in the entrance of the channel, in 4½ fathoms, with Porto Rico bearing S. by E., and Red Point, S.W. ½ W.

In the offing you may anchor at any distance, and in 35 fathoms, out of sight of land.

The *Barracouta*, from the southward, arrived here in an evening of Jan., 1826, and anchored; and on the following morning got into the bay with a sea breeze. "This is a small but good roadstead for moderate sized vessels, being 1¼ mile in length, with about 5 fathoms of water in the deepest part. Situated at the head of the bay is a large town,* where the king resides. The huts here are well built and capacious, and we found the natives very desirous of 'making trade.' The surrounding country, as seen from the anchorage, appeared in a high state of cultivation; but whether the soil is indebted to the inhabitants, or nature, we could not determine. The latter is whimsically prolific on some parts of this coast; while at others, her sterile frown withers every bud of vegetation as it shoots forth."

The following remarks are from Captain Owen:—

"From Kabenda to the Zahir (or Zane), a distance of 36 miles, the country is particularly fertile, and has a most luxuriant appearance, with apparently a large population, as numerous canoes may be seen fishing off the shore. The land is low near the shores, but sometimes terminating in a cliff; while, at a short distance inland, may occasionally be seen a high and sloping ridge of beautiful park land, the valleys presenting a most fertile prospect, abounding in groves of trees, among which the common palm was the most conspicuous. Kabenda is resorted to principally by slavers, of whom five were at anchor.

"The numerous huts that skirt the bay in groups, and extend inland to the distant hills, can scarcely be considered as forming a town, but rather an assemblage of villages, each respectively governed by a *Mafuka*, but the whole under the superintendence of *Prince Jack*, next heir to the king, whose capital is *Goy* (*Angoÿ*), a large town about 6 miles from the sea, containing a great population. The whole coast presented the appearance of being densely inhabited.

"Prince Jack, with 6 of his daughters, visited the *Barracouta*. He appeared to be upwards of fifty, good tempered, but with much affected dignity. He stopped on board during the night, and behaved at supper with much propriety.

"The scenery in Kabenda Bay is composed of lofty cliffs, verdant hills, and deep luxuriant vales. A great variety of trees, both in size and species, are dispersed in every direction, rendering the appearance of the country picturesque and pleasing. It is, however, impossible for a vessel touching for a few hours only to obtain provisions; for, as they are a minor branch of trade, when compared to that in slaves, ivory, or cam wood, none are engaged in it but those who have not the means to pursue any other. The residence of these people is in the country; and great delay takes place, even after they have received information of a vessel's arrival, before they come with their stock; and then the articles for exchange (for they will not take money) must be sent on shore, and the whole process of bargaining gone through.

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* When a town, in these parts, is spoken of as being large, the reader must not picture to his imagination a city of streets, squares, and palaces, but a few rudely formed huts, projected by necessity, and constructed by instinct, unassisted by art; yet, in a country where the most important is not larger than a European village, such a distinction serves, in some measure, as a guide to their relative sizes.—*H. B. R.*

"There are no bullocks here, but numerous herds of buffaloes range the forest in a wild state. These are hunted down and shot. Sheep are also scarce, but goats are plentiful, as well as ducks and fowls, but very dear.

"The natives were very desirous of procuring tobacco; but, as our crew were not overstocked, we did not barter much in that article.

"Parrots are very numerous here, enlivening the woods with the most shrill and discordant noises."

M. de Kerhallet says, "Kabenda is not a place for provisioning. But fowls, goats, and some kinds of fruit may be got, which may be advantageously exchanged for merchandise, or *fazenda*, a kind of coarse cloth. The bay, moreover, abounds with fish.

"The inhabitants of Kabenda are intelligent and industrious. They resemble, in some respects, the negroes of the Krou country, and willingly engage themselves to serve on board ship, during a stay upon the coast. They are also very useful in loading and unloading vessels.

"The trade at Kabenda is in ivory, gum, wax, honey, and, above all, in slaves. There is also a little orchilla and gum copal to be got."

From Point Palmas the coast runs S.W. ½ S. for 12 miles, as far as the projecting headland, called *Red Point*. The bank around Point Palmas, extending along it towards the West, continues to follow the coast, with a breadth of 1½ mile, as far as the Point. On some parts of it there are generally breakers.

The coast between Point Palmas and Red Point is low, covered at its edge with trees and mangroves. It rises a little in the interior into hills of a reddish colour, which are abrupt on the side towards the sea. This first line of hills is overtopped by another farther back, a good way in the interior.

The hills in the first range, of a nearly uniform height, rise 3 miles South of Kabenda, and extend to the mouth of the River Congo. Their summit, slightly undulated, only shows some depressions, with angular edges. In some places there are seen palm trees, which look as if they were laid out in regular plantations; sometimes the trees on the shore are interrupted by forests of palm trees, presenting the same appearance.

These hills, of an argillaceous nature, burned by the sun and beaten by the rain, are very friable and crumble easily. A great number of torrents descend from their tops, and cut deep gullies in them. Dried up in the fine season, they become vast torrents in the rainy season. South of Red Point the coast shows more distinctly the two lines of hills.

Five miles South of Point Palmas, two of these hills, nearer and higher than those around them, have received the name of the *Dous Montes*, the *Two Hills*.

In this part you must give the shore a wide berth on account of the bank which runs along it. Five miles off there are 5, and 5½ fathoms, the bottom of mud: 6 miles off Point Palmas there are 9 fathoms.

Red Point is low at its extremity, covered with trees, and hardly discernible from the East, but it is prominent enough when seen from the North or South. This headland rises rapidly for a short distance inland, and there it is overtopped by a small eminence, which is the highest point of the hill nearest the shore. This eminence is called the *Red Mount*, on account of its colour. In the neighbourhood of the Red Mount, on the top of the hills, is a mound of palm trees, looking like a plantation.

Red Point is skirted by a bank, on which the sea breaks. On the edge of it are 6 fathoms. From Red Point it extends westward 9 miles out to sea, and nearly reaches to the South point of Kabenda Bay.* The coast, between Point Palmas and Red Point, is inhabited, and appears to be well cultivated.

From Red Point to *Point Boolambemba*, the North point of the River Congo, the coast runs in nearly a straight line for 27 miles to the S. by E. ½ E.; only presenting some very slight curves.

The coast, at the foot of which is a narrow, sandy beach, exhibits nearly the same aspect as that already described; and as far as Pirate's Creek, a little to the North of Point Boolambemba, there is a range of hills, of an almost uniform height, sometimes bare, sometimes covered with clumps of trees.

About 4 miles to the South of Red Point commences the great bank of *Mona-Masea*.† On this vast bank the depths vary from 23 feet on its edges to 10½ feet. It extends 6¾ miles from the shore in its greatest breadth, and runs along it as far as the mouth of the Congo River; but then, near its extremity, there is no bottom at 50 fathoms, nor even in some places at 100 fathoms.

From the depth of 4 and 4½ fathoms the Mona Mazea Bank shoals very gradually towards the shore; though, in several places, the depth is irregular, and varies somewhat rapidly. For instance, from 23 feet you come suddenly to 3 fathoms. The bank does not usually show above water, and only displays some patches of rock on which the sea breaks strongly; in tide races it may become dangerous.

This bank is exceedingly useful for the navigation of the Congo River, of which we shall speak presently. The Congo is the southern limit of the kingdom of Loango.

DESCRIPTION OF THE ROADS OF LOANGO, MALEMBA, AND KABENDA, BY THE FRENCH MISSIONARIES OF 1773.

"The Road of Loango is good, and ships lie there well secured. To the S.W. it is bounded by a low point, at whose extremity are some rocky ledges, that stretch above a league into the sea, and shelter you from the S.W. winds; when you are coming in, you leave their outermost end to the W.N.W. of the ships seen in the road, which ships must be brought to bear S.E. to go to them.

"If no ships are perceived at the anchorage, you are to steer S.E. toward a remarkable tuft of trees, called *Looboo Wood*; or if you are afraid of some mistake, set up a flag, and fire a gun; and the negroes will come immediately in their periaguas, and show you the anchoring place.

"You find from 6 to 7 fathoms of water, 2 or 3 leagues off shore; then you come suddenly to 5, and insensibly to 4, fathoms; this depth leads you to the anchorage, in 17, 18, 19, and 20 feet of water (according to the size of your ship), oozy ground, mixed with fine sand. You moor across, N.N.E. and S.S.W., 1 mile from the land.

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* M. Rouxo de Rosencoat is the only commander who gives this extent off Red Point.—*Kerhallet.*

† This is perhaps the bank of which Capt. Rouxo de Rosencoat speaks; or it may reach a far as Red Point. This is not shown on the charts.—*Kerhallet.*

"When you are moored in 20 feet of water, the South point of the bay is bearing S.W.; Looboo Wood, S.S.E. 5° E.; and the middle of Ma-kimbe Wood, E.S.E. 5° S.

"The best place for small vessels is in 17 and 18 feet of water; then the South point is brought to bear S.W. ½ W. and W.S.W.; and you are by that means secured against the violence of the occasional currents; but in this berth, being nearest the land, you are exposed to its noxious exhalations, chiefly during the season of the greatest heat and of the rains; that is, from the months of October or November to those of April or May.

"The boats do not come to the shore, but remain at anchor in the offing, without a bar, upon which there is a great swell; and the landing is made with periaguas.

"To go out of the bay, barques may steer N.W. when there are breakers, and W.N.W. when there are none; but vessels ought to stand to the N.N.W. at least.

"The BAY OF MALEMBA lies to the N.N.E. [*North*] of Kabenda. When no ships are seen there, the marks for the road are, a small hillock, which borders the shore, and a little rocky point, extending into the sea. You anchor at a good league from the land, without any shelter.

"When you are approaching the coast, you find a ledge of rocks under water, at the end of the little point just mentioned; the boats, in passing over it, to fetch the landing place, go more or less from the point, according to the swell of the sea: when once past the pitch of this point, you turn in on the right, along its side; the swell decreases as you approach the shore, and you may come near enough to land without periaguas.

"KABENDA.—To enter into Kabenda, you are to steer toward a great tree, easily seen at the bottom of the bay, and bearing S.E. by S.; by that means you avoid, and leave on the port side, the sandy banks at the entrance of *River Belé*, which are very dangerous, and on which the sea sometimes breaks.

"You must take care, likewise, to give a proper berth to Kabenda Point (*Point Balma*), which is bordered with shelves that stretch a mile to seaward.

"The riding there is 3½ fathoms of water, soft ooze. You moor across E.N.E. and W.S.W., the best bower to port, on account of the gusts of wind from the South and S.E. Those from the N.W. are sometimes very violent; but when you moor E.N.E. both cables are labouring together.

"To be in the proper berth, Kabenda Point must bear W.S.W. half a league; the factory's landing place, S.S.W. 1 mile; and the great tree at the bottom of the bay, S.E. 2 miles."

COAST OF CONGO.*

In 1484 Diego Cam set out from the settlement of Elmina to continue the survey of the West Coast of Africa. He crossed the Equator, and discovered the River Congo, also called Couango, Zaire, or Zahir. He erected a marble column on the South cape of the entrance to it, and thence the cape has taken the name of Cape Padrao (C. Pillar), by corruption Padron. This discovery obtained in those days considerable renown.

The kingdom of Congo extends to the South as far as the River Loze, or Ambriz Bay, which is the northern boundary of the Portuguese possessions on the West

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* We have taken much of the introductory matter of the section from the Manuel de la Navigation de la Cote Occidentale d'Afrique, by M. Ch. Ph. de Kerhallet, 1852. The remainder from our former edition, &c.

Coast of Africa, South of the Equator. The three provinces to the West of this kingdom, which are washed by the Atlantic, are called, the most northerly, Sonhio; the middle one, Bamba; and that to the South, Mazula. They are entirely independent.

The West Coast of Congo, on the ocean, has only an extent of 110 miles, from Cape Padrao to Point Loze. The province of Bamba is separated from that of Mazula by the River Onzo. On the left bank of this river, and near its entrance, stands the town of Mazula. The whole of this country is intersected by a great number of rivers, descending from the western side of chains of hills in the interior, to which the Portuguese have given the name of the mountains Do Sal, Do-Sal-Nitro, Do-Cristal. The principal rivers of the coast we are now engaged upon are, as we proceed from North to South, the Rivers Ambriz, Couza, Rio Doce, or Loze, Onzo, and lastly the Dandé.

The trade of this coast, like that to the southward of it, is in a very unsatisfactory condition. From its being nominally under the sovereignty of the Portuguese, no other nation can attack the slave trade, which is still vigorously carried on at most of its ports, to the exclusion or destruction of legitimate commerce. Although there can be not the slightest doubt of the sincerity of the wish of the Portuguese Government to suppress this hateful traffic, yet it is certain that in very many cases it is connived at, or rather encouraged, by many of the officials. The legal trade of the region, therefore, languishes, and is in a very different condition to the commerce on the Guinea Coast, which is annually increasing, although the mode in which it is carried on is not unmixed with much evil.*

The RIVER CONGO, or ZAIRE.—This river is considered to be the fourth in magnitude of the African rivers, but beyond its lower course little or nothing is known. It was first approximately delineated by Captain Maxwell, in 1793, and was more completely surveyed by the unfortunate expedition of Captain Tuckey, R.N., in June, 1816. The lower part of the estuary was again surveyed by Captain Vidal, in December, 1825, and these form the basis of our present charts. But they are far from complete. We have no recent hydrographical account, but some good information is given by the reports to Government of H.B.M. Consul, Captain R. F. Burton, so frequently quoted, who ascended the river in July, 1863.

"With respect to the names of this noble river, Diego Cam, the discoverer in 1485, called it *Congo*, from the country which it waters. Afterwards it was known as *Zairo*, which Father Merollo, 1688, derives from 'zeoeco' (I don't know), the native reply to European inquisitiveness. D'Anville named it *Barbela*, a word unfamiliar to the people on its banks, Tuckey (1816) learned that it ought to be called "*Moienzi Enzaddi*," the great river.

"As may be imagined, the various tribes living near the Congo have no one name for it. Even in Fiote, or the Congoese dialect (wonderfully resembling the Kisawahili of the Zanzibar coast), we find Mulango, or Lango, the water; Nkoko, the stream; Mwanza, the river; Mwanza N'nene, the great river; and Mwanza Nzadi (whence Moienzi Enzaddi) or the River Enzaddi. The latter being the only proper name, was corrupted into *Zaire*, and even Zahir. The Portuguese, however, pronounce the word with a diæresis—*Zaïre.*—*Captain Burton.*

The Congo brings down an immense volume of water, which has hollowed for itself a narrow bed, of very variable depth. In many places there is no bottom at 200 fathoms. Forty miles from its mouth its waters are only partially mingled with those of the sea, and sometimes 9 miles out they are still quite fresh. From the great inclination of its bed it shoots out to sea in one unbroken stream, and so forms no delta.

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* Captain Burton's voluminous Report of the Trade and Mercantile Establishments in his Consulate of the Bight of Biafra, dated April 15th, 1864, is given in the Parliamentary Reports, 1865, vol. lvi., pages 240—252. The present condition of the commerce, chiefs and their government, and the articles of trade, are therein very fully treated on.

The main body of the stream of this mighty river is indicated by floating masses of bamboo, and debris of all kinds, which it carries far out to sea. The velocity of the current is said to range at from 4 to 8 miles an hour. It is high water, at full and change, at 4^h 30^m at the mouth of the Congo.

The stream of the River Congo is felt a great distance out at sea, and ships which cross it, in going to the North or to the South, ought therefore to guard against it. It is stated that 300 miles out the water is discoloured, and that the current of the river is perceptible at that distance, which is not impossible.

The Congo is only 7¼ miles wide between the West point of its entrance, called *Shark Point*, and the East point, called *Boolambemba*. The former bears W. by N. from the latter.

It is 24 miles from Red Point, described before, to Shark Point, and 29 miles between Red Point and Cape Padrao, the S.W. point of the mouth of the river.

Within these four points the mouth of the Congo is funnel shaped, being very wide in its West part, but considerably contracted between Shark Point and Point Boolambemba, and the bank of Mona Mazea still further narrows it.

The banks of the river, formed of alluvial deposits, are covered with mangroves, one species of which grows to a considerable size; it has a straight stem, sometimes 100 feet high, supported by an arch of roots, which rise as much as 20 feet from the ground. The spaces between these giant mangroves are filled with various kinds of trees of smaller growth, among which are a good many palm trees. Other parts of the banks are lined with common mangroves of low growth. The country near the river is low and marshy; but at some distance inland may be seen some wooded hills. Shark Point, which is covered with the tall mangroves, of which we have been speaking, is considerably higher than the land on the right and left of it.

The rising of the Congo occurs six weeks after the commencement of the rainy season, that is, about the middle of November. It then rises 8 feet 9 inches above its ordinary level. The stream becomes very rapid, and bears along with it floating islands, formed of the roots of plants of all kinds, covered with bamboos and grass; these are very dangerous for ships under sail, and especially for those at anchor. Some of them are more than 100 yards long.

The rains, no doubt, have much to do with the rising of the river; still we do not think they are the sole cause of it, but that it may be partially attributed to the strong sea breezes which blow at this period, and necessarily contribute to retard the flow of the waters, and to dam them up, as it were, in the upper parts of the river. Indeed, in the years 1845-6-7, the rains were very trifling on the Congo Coast, yet the Congo did not rise the less, though it was not so strong as usual.

It is a subject of regret that navigators, who have had occasion to enter the Congo, and to remain there some time, have not furnished us with more information about the tides. For all our researches, we can only give a few observations, which are far from being sufficient. We will speak first of the currents outside the mouth of the river.

The waters which come from a river, in running out to sea, usually diverge somewhat from the original course, and join the general current which sets along the coast, at a certain distance out. The point of junction of the two streams varies, as to its distance from the entrance of the river, according as the waters of the latter have more or less speed, or the current itself is more or less strong.

Although the rise or fall of the level of the waters is often perceptible at the junction of the streams, the effect of the tides is not more marked than usual.

At the mouth of the River Congo, the commander of the French frigate *Vénus*, in a voyage to Kabenda, in 1784, mentions having felt a strong current about 21 miles out, to the North of Cape Padrao. Being at anchor in 20 fathoms, the current was estimated by the log to set at the rate of 3 miles an hour towards the N.N.W. In the centre of the stream of the Congo, the captain of the *Vénus* estimated the rate of it at 6 miles an hour; and at the time he was off the entrance of the river, the stream constantly set out of it, notwithstanding the effects of the tide. This observation is important; and we shall see, hereafter, how it may be turned to account.

Off the mouth of the Congo, beyond the distance of 35 miles, the currents set to the N.N.W., North of the parallel of Boolambemba; to the W.N.W., on the parallel of the Point; and to the S.W., South of the parallel of Cape Padrao. Their speed is very variable, and attains often, even at this distance, a rate of 3 or 4 miles an hour. Sometimes, at spring tides and the dry season, the strength of the current may be crossed without feeling its influence.

The waters off the Congo are very much discoloured with a yellowish red or brown tinge; they are covered with foam and rubbish of every description. Very frequently South of Cape Padrao, along the shore, the sea is very much agitated, and shows in overfalls. At 40 miles out from the mouth of the river the waters become of a dark and blackish tint. They are brackish at this distance.

You must not enter the River Congo without a commanding sea breeze, which usually rises about 9^h or 10^h in the morning, and blows from the S.S.W. to the W.S.W. The stream in the river has been found, as we have said, to run at the rate of more than 5 miles an hour. The direction of the stream is from Point Boolambemba on to the Mona Mazea bank, and runs along the coast up towards Red Point. Its course on this side is then North, or N.W., or N.N.W., when near the right bank of the river. In the middle of the river, between Point Boolambemba and the left bank, the stream sets to the West; and near the left bank it appears to follow the course of the bank, i.e., West or S.W. In Diegos Bay, which is an indentation of the left bank, South of Point Shark, it sets towards the North as far up as this point. which it rounds, and on the meridian of which it takes a W.S.W. direction. Within the river, above Point Boolambemba, the current follows the direction of the banks.

Moreover, in the Congo, a rapid surface current, and an under one running in an opposite direction, is sometimes found to occur. In the instance in which this was observed, the ship, being becalmed, and drifting with the stream, was only carried at the rate of 1 or 1½ mile an hour, although the surface current appeared to be moving at the rate of 4 or 5 miles.*

There is no mascaret (bore) or *pororoca* at the entrance of the Congo, since this river appears to have at its mouth a bar, on which there is probably a depth of 20 fathoms, according to Capt. Owen. Thirteen miles from Cape Padrao, the greatest depth that this officer found was 44 fathoms.

At the time of the new and full moon there are dangerous tide races, which cause the sea to break violently on a portion of the Mona Mazea bank.

Between Red Point and Point Boolambemba there are to be found, in the midst of the palm woods, the villages of *Ma-Camma* and *Mona Mazea* (Mona Maji, i.e. little water), the former 17½ miles, the latter 3½ miles, from Point Boolambemba; then 11½ miles from the same point, the river *Dos-Mosquitos*, which may be recognized by a remarkable wood on its right bank, called the *Fetishe Wood*. Lastly, 1⅓ mile to the North of the same point is *Pirates' Creek*, with a tolerably wide entrance; the village of Mona Mazea stands on the point of the left bank of this strand. In the mouths of these two creeks, which often afford shelter to slavers, are found 12 feet of water. Dos-Mosquitos River is very narrow, and divides into two streams a short distance from its mouth.

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* M. de la Condamine mentions an analogous case. On the 28th August, 1743, the tide was felt at Pauxis, situated 100 leagues from the mouth of the River Amazon; the stream was moving seawards all the time, but still the level of the water rose, a fact which can only be explained by the existence of an under current.

"When at anchor myself," continues M. de Kerhallet, "10 miles off the River Pongo, I observed a similar phenomenon. The surface current always set to the N.W., according to the log, although the depth of water varied regularly and gradually, according to the ebb and flow of the tide."

Point Boolambemba, also called *Fathomless Point*, is a low point, with a clump of trees a little higher than those around on its southern part. Beyond this point is seen the plain of the River Congo, running E. by S., low, woody, and intersected by numberless creeks or rivulets.

A little inland a range of hills runs parallel with the shore from Red Point to Point Boolambemba, in a line with which it terminates. These hills, which are moderately high, appear from the offing to form the shore, which at their foot is lined with thick trees. Some single, scattered trees are seen on the top of these hills. With Boolambemba Point bearing E. ¼ N., and Shark Point S.S.E., at a distance of 18 miles from the former, the low coast is just distinguishable by the line of trees upon it, which have open intervals here and there. But to the right is very distinctly seen the rounded and pretty steep declivity which terminates the hills in the interior.

More to the South is seen the low, woody country of the left bank of the river, the trees appearing in the water at this distance; then, on the right, Shark Point is easily recognized by its tall mangroves.

Shark Point, as we have stated, is the extremity of a kind of peninsula, low and covered with trees, which stretches out to the N.E. Some lofty mangroves form a clump, remarkable for their height, at the extremity of this point.

To the East of Shark Point the coast trends inwards, and forms a bay, which is filled by banks with only 9 feet water on them. There is a narrow channel through them, caused by the flowing of several watercourses into the bottom of the bay, which is called *Sonhio*, or *Diegos Bay*.

Shark Point is steep-to, and near the sandy beach which skirts it you find 7 fathoms, then 26 fathoms. But a little to the East of its meridian you find, quite close to the sandy beach, 2 fathoms; and in its eastern part 4 and 5 fathoms close in-shore. You can pass it within one-third or even one-quarter of a mile.

At 2⅔ miles to the W. by S. ¼ S. of Shark Point, the shore forms a gently rounded eminence, covered with tall trees, called *Turtle Corner*, and 3 miles W.S.W. from this point is Cape Padrao.

CAPE PADRAO, or Padron, seen from the North, 7 miles distant, has the appearance of a perpendicular cliff, which runs down to the beach; just above the beach are some woods. The cliff forming the cape rises rapidly, with a rounded elevation. Its summit is covered with a stunted vegetation, apparently of grass and brushwood. The colour of the cliff is remarkable for its rosy tint rather than red. Cape Padron is called by the Portuguese *Mouta Secca*, or Dry Thicket Point.

A fortified Portuguese post stands near Cape Padrao, and is called *Porto Pinda*. As it now stands, it was established in 1855, and is subject to Ambriz, but it had been an early settlement of the Portuguese.

The land of Cape Padrao is low, and the sea washes the foot of the cliff. All the shore is safe hereabouts, and you can cruise along it in 10 or 13 fathoms.

When you come in sight of Cape Padrao from the South, you may see to the N.E. the land on the right bank of the river. From a distance you may often fancy you see a town and houses built in a semicircle, an illusion caused by a confused mass of rocks, which have this deceptive appearance. From Cape Padrao the land slopes down to Shark Point.

Between Point Boolambemba and Shark Point the entrance of the River Congo is well defined, and is, as we have said, 7½ miles wide. The right bank of the river then takes an E. by S. direction, forming at Point Boolambemba a very acute angle, while the left bank trends inwards gently, describing a semicircle.

In nearing either bank the depths vary from 6 to 8 fathoms, except near Point Boolambemba, where there is no bottom at 93 fathoms, one-third of a mile out.

In mid-channel there is no bottom with 80 or 100 fathoms at the mouth of the river, and for a distance of about 25 miles up the stream. This circumstance renders the navigation very difficult, and sometimes even dangerous. It will, therefore, be always prudent to get a local pilot, from Kabenda or elsewhere, to take the ship into the Congo.

When you want to go any distance up the river, it will be necessary, whichever direction you come from, to keep close along the left or South bank; so that, coming from the North, you will have to cross the strength of the stream. We will explain how this is to be effected, so as not to be driven out to sea by the current.

Coming from the North, it will be sufficient, to enable you to cross the stream, to have a fresh and settled breeze from the S.W. or W.S.W. When we speak of out at sea, we suppose that you are 150 or 200 miles from the coast, at which distance it is said that the current from the Congo attains at certain periods a rate of 2 or 3 miles an hour. It is not known at what distance this current, which usually has a N.W. or N.N.W. direction, becomes united with the Atlantic current, which sets along the coast from the Cape of Good Hope; but as the latter has a speed of not more than 24 or 26 miles in 24 hours, it is possible that the current of the Congo may be felt at a very great distance.

The second course for crossing the river in coming from the North, and the one generally taken, is to tack along the shore between Kabenda and Red Point, without leaving the bank of soundings. When you have made Red Point, then anchor, if you find you cannot make way. But if the sea breeze is favourable, you must calculate so as to get clear across the stream while this breeze lasts, and to reach the left bank of the river before it drops. So that even if you have reached Red Point, and are not sure of having time enough to cross the current, it will be much better to anchor somewhere off the point, and wait for the sea breeze next day, and then to weigh as soon as it is well set in. This breeze usually rises about 9 or 10 o'clock in the morning, and blows from the S.W. or W.S.W. till evening.

If you only want to proceed down to the coast to southwards, without entering the river, after you have got across the stream, you will keep on your course as long as you have a fresh sea breeze; and in case it is nearly ceasing when you have traversed the current, the better way will be to anchor to the S.W. of Cape Padrao, 3 or 4 miles out, according to the distance you have got from the mouth of the river, and there wait for the next day's sea breeze to carry you on along the coast southwards.

In this course you must steer in the following manner: on leaving the parallel of Red Point, at a distance of 9 miles from the point, set the head of the vessel on to Shark Point or Cape Padrao, as far as the parallel of Pirates' Creek. Here the streams set to the N.N.W., and it will be sufficient to coast along about 9 miles out to clear the Mona Mazea Bank in 10 or 11 fathoms, in which depth you should keep; the course will be about S. by E.

Then when you get on a line with Pirates' Creek, or even before, according as you feel the force of the current greater or less, or a tendency in it to set towards the W.N.W. and West, bring the vessel up as if you intended to enter the river, steering right for the middle of the open space between Point Boolambemba and Shark Point. You will in this way get across the strongest part of the stream, and when you bear up for the left bank, haul your wind and steer so as to be carried on the South shore, till within 3 or 4 miles, and then anchor as you please.

If you want to enter the Congo, you must still anchor in the S.W. of Cape Padrao and await the sea breeze to carry you in; unless you are in time to double Shark Point, and to anchor on the left bank to the East of this point.

You must never attempt to cross in the evening, for it is seldom that you would in this case have time to clear the main stream during the continuance of the sea breeze; and if it were to drop before you reach the left side, you would be inevitably carried out to sea.

Coming from the South, when you have sighted Cape Padrao, you may bring up 3 miles off, which may be done without danger. If you arrive at night, anchor to the S.W. of the cape, and wait till morning for the passage across. As soon as the sea breeze becomes settled, then weigh, and with the cape bearing E.N.E. or N.E. by E., you will be in the most advantageous course for clearing the stream. Keep this course till you begin to find yourself in the bed of the stream; then bring the cape N.E. by N., or N.N.E., and keep the lead going, to be sure of the moment you get on to the Mona Mazea sands on the right bank.

When you are going to Kabenda, you must keep off the Mona Mazea Bank; and on leaving the Congo run out to sea for about 40 miles from its mouth, before you put the ship's head to the North, in order to avoid a bank which is not marked on the charts, and which, beginning at Red Point, extends 9 miles to the West of the point, running up to the North to join Point Palmas, the South point of the Bay of Kabenda. You must also take notice of the current which sets to the N.N.E. at the rate of 1 mile an hour, sometimes more, according to the strength of the wind.*

The brief directions for entering this river, as given by Capt. Vidal, R.N., are—"It is necessary to approach the river from the southward, and anchor near Point Padron, until the sea breeze sets in strong enough to stem the current round Shark's Point, and proceed up, keeping the southern shore aboard. Latitude of Shark's Point 6° 4' 36" S., long. 12° 12' 30" E.

Near the outer entrance of the estuary is *Banana*, or *French Point*, where there are two unprofitable legal factories, but slaves are embarked. It has 3 to 3½ fathoms alongside. At 10 miles above this also, on the North side, is *Bull Island*, a clump of trees, the Rhinoceros Island of Capt. Vidal's chart. It is a slave depot.

Puerto da Lenha, a famous slave shipping port, is 12 or 13 miles above Bull Island, and stands on the point projecting from the North shore, marked Tall trees in Capt. Tuckey's chart of 1816. This is at the head of the estuary, and above this may be considered the true delta of the mighty Congo, which, although navigable, does not belong to ocean navigation.

Captain Burton says,—On August 31, 1863, we made sail from Banana or French Point. Our party consisted of Commander Perry, R.N., Mr. Bigley, R.N., and five petty officers, myself and Steward Salim Agha. We ran up the right or northern bank, which is here, as in the oil rivers of the Biafra Bight, a mass of thicket and mangrove, of palms and pandanus, and anchored for the night off Bull Island, distant 6 or 7 miles. Even this the debouchure of the river greatly requires re-surveying; there is hardly a portion to be relied upon, and the delicate questions of the tides and of the undercurrent, which at times in most places run counter to the surface stream, remain to be settled. And here it may be remarked that, with due prudence, and by taking advantage of the reflux caused by the flood-tides damming up the mouth—a phenomenon which extends to the rapids—small steamers might easily, and at all seasons, ascend to within musket-shot of the *raudales*, or cataracts.

On Sept. 1 we passed the last mangrove, showing that the saline influence extends no further. We remarked sundry factories, one-storied buildings of plank and thatch, peeping from holes cut in the densest bush, and most unwholesomely situated. They serve as videttes and outposts, enabling slavers to ship below the difficult passage around Palm Point, and they command a straight reach and a clear view to the river's mouth. Moreover, those on the South bank (also three in number) facilitate overland transit to Mangue, Ambrizette, Ambriz, and other ports.

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* Instructions sur la Cote d'Afrique, par M. Rouxo de Rosencoat.

After 22 or 23 miles from Banana Point, with a three-knot current against us, we landed at Porto (or Puerto) da Lenha; on our latest charts, *Ponta de Linha*, three errors in three words. The vile site is on the right (or North) bank of the river, whose valley is here 5 miles broad; the water is fresh, and when taken a few miles up is fit for drinking. The settlers, beaver-like, must protect their dam with strong piles, and a rise of 4 or 5 feet inundates their foundations. The port dates from the second decade of the present century. Capt. Tuckey knew it only as "Tall Trees," and ships loaded without landing. There are sixteen factories, but only *two* legal traders. Above Puerto da Lenha the mighty river divides into three parallel branches, separated by the isles and banks, the northernmost (or Maxwell River) is the Nka'nga'; the central (Mamballa of the charts) is called Nshibul; and the southern is the *Sonio* or *Sonho* of the charts.

Capt. Burton ascended the river above this to the Yellala Rapids, restored in health, by this delightful region, in September, 1863.*

Boma, meaning the snake, and erroneously written *Embomma*, is at the head of the Congo delta. It is 6 miles below the place marked as such by Tuckey, on the North bank of the river. It is delightfully situated, the air dry and healthy. It is the depot between the interior and the coast, and has been one of the greatest slave marts in the world, either in the form of the *real* slave trade, or its legalised traffic known as the French immigration scheme, now abandoned.

After adventures and observations Capt. Burton reached the Great Rapids. In conclusion, he observed that, above those rapids, the grand river forks. There is a north-eastern branch, which has been represented as flowing from a lake. The information he obtained at the rapids left him no doubt of the fact. In the previous year, when he visited the source of the River Gaboon, he was informed by the Fans, that after eighteen days' travel towards the East, they came upon a water flowing to the right or southward; this must be the north-eastern fork of the Congo. The south-eastern branch of the Congo, Capt. Burton firmly believes, is the Coango and the Casai, which Dr. Livingstone crossed near their head.

REMARKS AND DIRECTIONS, BY THE FRENCH MISSIONARIES, IN 1773.

"CONGO RIVER forms a most impetuous current at its mouth. In order to cross over that current, when coming from the South towards Kabenda, you go alongshore, at 1½ or 2 leagues' distance, in 10 fathoms of water. The coast is low, and covered with woods.

"If you should happen to be on the South side of this current, and night coming on, you must come-to and anchor to the S.W. of Cape Padron, 1½ or 2 leagues off the coast, and wait till the breeze shall be formed next day. It would be hazardous to attempt the passage during the night. The breeze commonly begins at 9 or 10 o'clock, and blows from S.S.W. to W.S.W. You direct the head of the ship from E.N.E. to N.E., to encounter the current in the most advantageous manner, and keep it so till you begin to be in the bed or channel of the river, when you put the head to N.N.E., having a continual recourse to the lead. The water runs with such force in the middle of the channel, that it carries away the lead; and you would attempt in vain to moor, if you were overtaken there in a calm.

"When you are past this impetuous current, you find from 16 to 13 fathoms of water, and then must come nearer the land, approaching it within 1½ league; you are to keep within 6 and 8 fathoms, without ever coming under 5, from fear of some sand-banks, on which there are not more than 15 feet of water; besides, by keeping in the above depths, you find everywhere an even ground, where you can safely anchor in case of a calm. So soon as you can descry Kabenda Hills, you may steer N.E., provided you should keep always in the same ground.

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* Vide Consular Reports in Parl. Papers, 1865, vol. lvi., pp. 216—224.

"Within 4 or 5 leagues of Kabenda you may perceive the ships which lie in the road, over a very low slip of land, which is called Palm-trees Point. Should you not be inclined to come immediately into the road, the ships are to be brought E.S.E., and Palm-trees Point S.S.W., and then you come to an anchor in 5 or 6 fathoms, oozy sand."

REMARKS ON THE ZAHIR, BY MR. GEORGE MAXWELL.

"VESSELS sailing out of Congo River should take Shark Point close on board, and anchoring under it, supply themselves with fish, which they may do abundantly in a couple of hauls with the seine. But this coming to Shark Point should never be attempted till the sea breeze sets in, lest the irregular eddy current running off it should render the vessel ungovernable, and sweep her over on the Mona Mazea or N.W. shore, the bank of which should be approached no nearer than in 5 fathoms; and it is dangerous to anchor there when a heavy swell sets in about the full and change, the current running N.N.W. on the edge of that bank, at the rate of 7 miles per hour.

"Vessels intended for the Congo should be provided with a mooring chain, or chain cables; the water of that river having the quality of rotting cables in a short space of time.

"About six weeks after the commencement of the rainy season (that is, from the middle of December to the latter end of April), you find in the river 9 feet more water than the common depth; and it has a very rapid current, which brings along with it numbers of floating islands, some of them 100 yards in length, composed of fibrous roots, and covered with grass, which renders it very dangerous to vessels at anchor when tornadoes happen, which are also very frequent."

REMARKS FROM THE NARRATIVE OF CAPTAIN W. F. OWEN.

1825. Dec. 24.—"Entered the Congo, and for six successive days in vain attempted to stem its rapid stream; but on the 1st of Jan., 1826, the sea breeze being stronger than usual, we succeeded in passing Shark Point, where the current always runs with the greatest velocity, and in about thirty hours anchored at 25 miles from the southern entrance of the river. Here the Congo (Zahir) was not more than 1¼ mile in width; and, at a short distance above, a broad sand-bank divided the stream into two narrow but deep channels.

"The banks on each side above Shark Point are low and swampy, and covered principally with two different kinds of mangrove; the one a low, groveliing bush, and the other a stately tree, resting on a forest of roots, upwards of 20 feet above the ground, the trunk often rising to the height of 100 more. Most of them are perfectly, and if the wood were a little lighter, they would be admirably, adapted for masts. The spaces between these lofty trees are filled up by a variety of smaller growth, but with beautiful and luxuriant foliage, among which are many of the palm kind.*

"The great body of water discharged by the Congo has scooped out a channel for itself, narrow, but immensely deep, above Shark Point, seldom more than a mile across, varying in depth from 200 to 45 fathoms. The great force of the current in the river is apparently but superficial, as when drifting out, during a calm, the vessel was so much retarded by the current below that the superficial one was running past apparently at the rate of 1½ miles in the hour, when its real velocity was about 4 miles.

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* See further the copious description of the Congo, its Chiefs and People, in 1825-6 Owen, vol. ii., p. 284.

"Many floating islands were seen coming down the river, formed of rushes, reeds, and long grass, and frequently covered with birds. Vessels are sometimes deceived by these, which occasionally drift a long way to seaward. The country at the mouth of the Congo is apparently very fertile, and presents many agreeable views; a range of high lands, covered with clusters of trees, extending some distance along its course.

"The people of Kabenda give the inhabitants of the mouth of the Congo a bad character for treachery and cruelty. They stated that whenever an opportunity offered for attacking a boat, either of Europeans or Africans, they would kill those who were likely to be unprofitable, and preserve the remainder for slaves, or to be ransomed. If they made any resistance, a death of torture was inflicted on them all; but if allowed to live, they were stripped naked, made to procure their own food in what manner they could, and kept at hard labour in the most servile duties. This character of these people was subsequently cornfirmed; while those inhabiting the shores at a few miles from the mouth were described, as Captain Tucker had found them, a harmless, inoffensive race."

DIRECTIONS BY CAPTAIN TUCKER, R.N.

The passage up may be made at all times of the day, with the flood tide, or against the ebb, if the sea breeze be strong enough. The best time for a stranger to make it is certainly with the first of the sea breeze; though, on taking H.M.S. *Wolverine* to the shoals a second time, I went up in the afternoon, and on the third time I went up in the evening, passing the lower shoals, and anchored at 8^h p.m., close to a slave vessel lying between the two lower shoals.

The passage up should be made on and close to the left bank, until you arrive at the lower shoal, about 20 miles from the mouth of the river, where a spit with 2, 1¾, 1½, and 1 fathom on it runs off the left bank about a cable's length, which shows itself at low water, by the smoothness of the water on the lower part of it. From thence you should steer diagonally across the river, keeping her head well up, for a low, sandy, and green island on the right bank, keeping close to the lower edge of the lower shoal in 7, 8, and 9 fathoms until you arrive near the island, when you must steer up close to the right bank, carrying your lower studding sail booms over the bushes, having 6, 7, 8, 9, and 10 fathoms, except a small shoal with 4 fathoms, when you must edge off a little, so as to pass it about a vessel's breadth from the bank. Then you must steer along the bank again until you arrive off Puerto da Lenha, and anchor in 4 and 4½ fathoms, a mile above which the river is not navigable for vessels.

The passage down is rather dangerous; but I think, by attention and prudence, it may be aways made with safety. The usual passage down the river is crossing to the left bank above the shoals, and passing between them and the bank; but should only be attempted with a commanding sea breeze, with which, even, it is necessary to keep the ship's head well up the river, and allow the stream to set you gradually down until you gain the left bank; when you must drop down close to the bank in 4, 3½, and 3 fathoms, either by kedging or under sail. I prefer the latter.

The danger of crossing the river in coming down arises from the wind falling or lulling, and the vessel, in consequence (if not brought up very smartly with her anchor), being set by the stream upon the upper edge of the shoal; which has caused the total loss of many vessels, and the loss of rudder of many others. In light winds I should therefore recommend the vessel to be taken down by the sweeps, on the right bank, with the kedge ready to be dropped, and the boats down ready for towing, until you arrive on the lower edge of the lower shoal; when, if there be no sea breeze, it will be necessary to bring the vessel up with a bower anchor in 7, 8, and 9 fathoms, to avoid the shoal running along the right bank, over which the stream sets with great force. But if the sea breeze be commanding, you may cross over to the left bank by keeping the vessel's head well up the river until you get well over; when you may either back, or fill, or work down, standing from 4 fathoms on the left bank into not less than 7 fathoms on the right bank, until past Boolambemba Point and Spit, when you must not stand into less than 4 fathoms.

With respect to the shoal of 3½, 3¼ fathoms, on the *Mona Mazea Bank*, in the mouth of the river, which I have laid down, I am of opinion that it is of a very late formation, and will prove very dangerous to vessels crossing the river as I did. Steering well up the river from the southward to cross over to Cape Padron, carrying 7 and 8 fathoms, I suddenly got into 3½, 3¼ fathoms, along which I ran, carrying 7 and 6 fathoms on the port side, and 3½ and 3¼ fathoms on the starboard side, for about more than three ships' lengths.

I am of opinion that the whole of the Mona Mazea Bank is rising fast, from the deposit of mud out of the river, and from the sand thrown over by the heavy swell which often sets in upon it.

It is high water, at full and change, 4ʰ 30ᵐ; variation, one point and three-quarters.

REMARKS BY CAPTAIN E. H. BUTTERFIELD, R.N.

"The depth of water in the Congo differs very much from the soundings laid in the chart of that river, and several banks exist which are not laid down at all; but we had no opportunity of surveying them. The water in the stream, in 14 fathoms, is very good; the tide running from 6 to 7 knots. In 5 fathoms, near the shore, where we anchored to procure wood, the water was brackish, and the anchor brought up a mass of putrid leaves, as black as ink. We cut wood in forty-eight hours sufficient to last three months; and found the natives very anxious to trade, either in slaves or ivory.

"I would recommend no one entering the Congo until the sea breeze sets in strong. The *Fantome*, going 5 knots, was completely turned round two or three times; and great care must be taken to keep on the South shore, as the tide sets directly on the Mona Mazea Bank, and, at such a rapid rate, a ship is almost unmanageable with any wind. In coming down the river (in December we found the water 8 ft. deeper than in July), keeping well over on the South shore, we were set directly out of the river. We came down with a 1-knot breeze, the tide running 5 and 6 knots. On the South side of the stream the current appears to set about W. by S., *true*, and to the northward of it about N. by W., *true*.

"The climate is so fine, that the natives' huts are generally built without roofs. The *Fantome* has been on this station since June; and we have never experienced rain to last one hour, nor any, more than six days, between that time and December 31st, 1840. The thermometer generally in June, July, August, and September, was 70°, and in November and December, 80° to 82°."

GENERAL REMARKS AND INSTRUCTIONS ON THE NAVIGATION BETWEEN BIAFRA AND CONGO.

The navigation between the Bight of Biafra and Congo seems to have been very imperfectly understood, owing to a general ignorance of the setting of the currents and local circumstances. The currents of the bight are clearly variable. On the East of the islands the stream has been described as setting to the South; while at Prince's Island a north-westerly current on the East, and a more northerly current on the West, are occasionally found. A northerly current is also described as prevailing on the coast, all the way from Cape Negro, in 17° South. The following extracts from the Narrative of Captain Tuckey's Voyage will show the necessity of keeping clear of the bight, and attempting a more direct passage from the West, when bound to the coast of Congo, &c.

On the expedition to the River Zahir, the ship *Congo* had Prince's Island, in sight, 16th May, 1816, at the distance of 12 or 14 leagues. From the spot whence the island bore *S.E. by S.*, *true*, at that distance, the ship, with light airs from the South to S.W., attempted a southerly course, but a strong current setting to the northward impeded it. On the 19th, at daylight, St. Thomas's was seen, bearing *S. by W.*, *true*, 12 or 14 leagues. The island was in sight for two days, the ship making scarcely any way to the southward. She then stood to the westward; but the wind and current still continued unfavourable, and she did not succeed in getting to the southward of St. Thomás's until the 27th, having been obliged to stand to the westward as far as the meridian of 4° East, and at length passed only about 4 leagues to the southward of the island. Observations here gave for the position of the Isle Rolas, the Equator, and longitude about 6° 45′.

The ship continued working to the southward, taking every advantage of the wind, and frequently trying for soundings, without obtaining them, until the 3rd of June, when at noon 17½ fathoms were found, with greenish ooze. Here the coast was seen; the latitude 2° 10′ S., computed longitude 9° 29′ E.* The land was about 4 leagues to the eastward. The weather was hazy, so that no remarks on the coast could be made. It was, however, inferred that the bank of soundings here does not extend further off than 10 leagues. At 10 or 12 miles off-shore were 18 fathoms, with greenish ooze; thence *S.W. ½ W.*, *true*, 5 miles, 30 fathoms, coarse sand; thence *S.W.*, *true*, 3 miles, 47 fathoms, sand and broken shells; thence *S.W. by W.*, *true*, 4 miles, 67 fathoms, same bottom; and thence *S.W. by W. ½ W.*, *true*, 4 miles, no bottom with 100 fathoms.

From the 5th of June the *Congo* continued to work out of soundings, but making very little way to the southward, until noon of the 17th, when she gained the latitude of 3° 12′. Running hence *E. ½ S.*, *true*, 12 miles, soundings were gained in 66 fathoms, coarse brown sand, with red specks.

On the 25th of June, at noon, the ship had gained no more to the southward than to 3° 49′ South. On the 26th, to 4° 8′. On the 28th she was in 4° 24′. Some observations on the coast were now made; but they are too inaccurate for admission. On the 1st of July the ship was off the South point of the River Louisa-Loango, then bearing *E.N.E. ½ E.*, *true*, 7 or 8 miles. The current here ran N. by W. about three-quarters of a mile hourly. On the 7th the ship had arrived in the Zahir.

Captain Dalzel's Directions state, that vessels sailing from Cape Lopez to Kabenda or to Congo River are continually tacking and veering, being obliged every evening to come to an anchor. The practice is, in the morning, so soon as daylight, to put off, and keep to seaward till 11ʰ or 12ʰ, when the wind is South or S.E., and also when it is still. If then it does not chage, a vessel loses ground, although in 80 fathoms of water. In this case, get up again with anchors; but when you come below anchoring ground, you cannot gain the river; and it would even be very difficult to pass by the entrance of Kacongo River, as the current sets there most part of the year to the N.W. and N.N.W.; and though, from March to September, when the S.S.E. winds are blowing, the currents may run toward the S.W. by S., yet it is advisable to keep off as before, and even further; the sea during that time falls with a greater violence against the shore than at other seasons of the year.

Capt. Matson says:—To cross the stream of the River Congo from the northward, it is requisite either to go 200 miles off-shore, or to keep in anchoring ground. I always choose the latter. If you are not certain of getting across the stream before the sea breeze dies away, anchor on the Mona Mazea Bank, in 6 or 7 fathoms, until the following day, when a two hours' sea breeze will take you to the southward of Shark's Point, and you are then out of the influence of the stream, which always runs to the N.N.W."

Along this coast, between Cape Lopez and River Congo (says Pimentel), it is not fit to sail but in the morning. So soon as the wind comes from the South toward the land, you go to seaward for 12 hours; and if it does not change, come back again to the shore, where almost everywhere you will have 8 or 10 fathoms of water. As the current all along runs much to leeward, N.W. and W.N.W., should you perceive it setting to the S.W., the best way is to take a trip to sea two hours before daylight, and then to return and anchor near the land. Any other method would make it very difficult for passing the River Congo. The current being to leeward, when you turn about to sea, with the wind at West, or W. by S., and you ship halfway, it is advisable you should come back to the land, to anchor in 10 or 12 fathoms, oozy ground. which you will find in all this part; and if the wind should happen to blow from the S.W., you are to turn toward the sea.

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* This must be the low coast to the southward of Cape St. Catharine, which we now place in long. 9° 23′.

The COAST from Cape Padrao to the River Dandê is about 156 miles in extent. It is of moderate elevation in general, but nevertheless higher than that we have thus far described. It also becomes more rocky at its base, and in some places it presents reddish cliffs, surmounted further inland, and chiefly towards the South by a second line of hills. The line of soundings, 2 or 3 miles out, is also less regular; but still the coast is generally safe. It is sometimes wooded, sometimes with naked hills, merely capped with isolated clumps of trees. This is its general aspect.*

From Cape Padrao to Cape Engano, or *Deceit*, the coast runs S. ¾ E. for 21 miles, nearly in a straight line. We have described Cape Padrao, as seen from the North, and remarked the rose-coloured or reddish cliff which distinguishes it. When seen from the West, it presents rounded undulations; the summit of the hills being covered with a poor and stunted vegetation. After doubling Cape Padrao, the cliff disappears, and is replaced by a low coast, gently undulating, on the top of which in some places are some very straight lines, and here and there tufts of brushwood. When you get 3 miles to the South of the cape, it looks low, and slightly projecting. Some bright red cliffs are seen hereabouts, tolerably high, and continuing for a long distance without any break. They show very little vegetation. Shortly after, the coast changes in appearance, and becomes arid, rather high, and retreating from the shore; here and there are seen red cliffs. The steppes which form these hills are marked by lines of trees and brushwood, and are sufficiently high to be easily recognised. They are called the *Barreiras Vermelhas*. Along this part of the coast the sea is generally very rough.

Cape Engano, or ENGANADOR (Deceit or Deceiver), presents nothing remarkable; it is slightly prominent, and to the East is seen a small conical hill. The red colour of the cliff which forms it has no doubt been the cause of its being mistaken for Cape Padrao; and to this perhaps it owes its name.

From Cape Engano the coast curves inwards gently, and forms a bay, the South point of which is called *Margate Bluff*. This point, situated 9 miles from Cape Engano, is projecting, of a round form, rocky at its base, and crowned by a tolerably high hill. It is 30 miles distant from Cape Padrao. At Margate Bluff commences the high land which continues southward as far as the Bay of Funta, a distance of 30 miles.

Margate Bluff is the North point of another bay, with a sandy beach, and showing near the middle of it a rocky headland, which terminates towards the South, in a rather high point, distinguishable by a clump of trees of a dark green, in lat. 6° 39′ S., long. 12° 28′ E., called *Mangal-Grande*. It is 1 mile North of the South point of the bay, and marks the entrance of a small river, which runs amongst the small hills near the shore. The South point of the mouth of the river, which is also the South point of the bay, shows some lofty cliffs, pointed at top, with their summits covered with shrubs, and overtopped again by a mountain, the top of which is gently rounded and bare. This point is called *Mangal-Grande Point.* It is 37 miles from Cape Padrao, and is a slave port.

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* There is some confusion in the nomenclature of this coast arising from the imperfection of the older charts. M. de Kerhallet, from whose work we have taken much of the subsequent description, has, by comparison of numerous authors, settled on the arrangement which has been partly followed hereafter.

From Point Mangal-Grande to the North point of the *Bay of Funta,* in lat. 6° 56′ 30″ S., long. 12° 43′ 52″, is 22¼ miles. The coast trends to the S.S.E., presenting, for a distance of 16¼ miles, an uninterrupted sandy beach. Behind this beach may be remarked here and there some rocky cliffs almost perpendicular, overtopped by some rounded hills, and almost bare of vegetation. 6¼ miles North of the Bay of Funta the sandy beach is interrupted for some miles, and the cliffs come down to the water's edge; but soon after the sandy beach reappears, and continues as far as the North point of the Bay of Funta, to the East of which runs the River Lelunda.*

The Bay of Funta, or Funda, is at the mouth of the River Lelunda. It is 4 miles wide between its two points, both of which are low and sandy, the cliffs not appearing again till you get 4 miles South of the South point of the bay. The bay is not deep, and affords no shelter, being open to the S.W., and thus exposed to the winds from seaward. A reef runs out from its North point 3 miles southward, and must be carefully avoided when approaching from the North. You can anchor off the bay in 7 fathoms, with the entrance of the Lelunda bearing N.E. ¼ N., 5 miles distant. You may also anchor 8 miles off, the River bearing S.E. by E.

The mouth of the *Lelunda River* is indicated by some clumps of trees growing close to the beach, beyond which, to the South, are some cliffs and isolated trees. On the left bank of the river, 4 or 5 miles inland, are some trading huts, and the bay is notorious for its slave traffic. Several slave ships have been captured in it.

From the South point of Funta Bay the coast runs, with a slight curve, to the S. by W., as far as the entrance of the River Couza, or Cousa, which is 12 miles from the point. The beach is sandy for about 5 miles, and then the low rocky cliffs reappear as far as the Cousa. Four miles South of Funta Bay, above the scattered downs on the shore, which presents no longer that level surface which gave it the appearance of a red wall, you will see a rather high mountain, crowned at top with some low trees; it is called *Funta Mount.*

This hill stands a little inland, behind the land above the rugged cliffs of the coast, which lie behind the sandy beach. It is the last prominent hill rising above the line of coast, which becomes generally low, and remains so as far as the River Cousa. It presents a continuation of cliffs of uniform height, intersected here and there by what appear to be the outlets of torrents or ravines among the round-topped hills. Seen from 5 or 6 miles out at sea, these cliffs appear of a yellowish colour, almost like ochre, and sometimes reddish, when they look clear. They contrast stongly with the blue tint of the sea, and with the green level of the country behind them.

River Cousa, or COUZA.—The entrance of the river may easily be distinguished by the tall trees about it, and by a gap in the cliffs we have been speaking of. To the South of the river these cliffs reappear, but less elevated, and their summit is flat. The loftiest trees are on the point of the right bank of the river, called *Point Palmas,* and their dark hue stands out strongly against the yellowish tint of the cliffs on the left bank. The South point of the entrance is skirted by a small bank, which runs 1¼ mile out. To the East of the entrance is a group of hills, the highest and most southern of which is called *Cousa Hill.*

On the level land are some very thick clumps of trees, among which you may distinguish a village. Close to the sea there is an isolated hut upon the cliff, and behind this again some large trading huts.

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* Two shoals are said to have been discovered near the Congo. One of them was seen by the Captain of the French corvette the *Recherche,* at 4 or 5 miles from land, between the mouths of the Cousa and Congo, with 16 to 20 feet water on it, and 12 fathoms near it.

The other is 3 or 4 miles from shore, off the high point called Cabeza de Cabra. It has but 14 feet water, and was callen the *Vesuvius Shoal* by the captain of an American ship which struck on it in 1858 or 1859.—*Annales Hydrographiques,* 1862, ii., 466.

At 5 miles South of the North point of the mouth of the River Cousa is *Cape Juma*, or *Foreland Bluff*. The coast between is formed of cliffs, rising gradually. Foreland Bluff is itself formed of a high cliff, projecting seawards when seen from the South, but appearing less prominent from the North or West. The top of this cliff is covered with stunted herbage.

THE KINGDOM OF ANGOLA.

This country is also a Portuguese possession. It is so by right of discovery in 1485, by their christianising it in 1491, and by re-conquest in 1569. At the first named period, Diogo Cam, sent by King Joao II. of Portugal, discovered and explored the Zaire, erecting the pillar (padrao), on its South bank. In the following year, after quitting the Congo he went as far South as Cape Negro, planting two other columns, as hereafter noticed. The name is perhaps derived from that of the native conqueror under the Portuguese commander, Francisco de Govea, in 1569, *An-Gola*, the son of the Jaga of Matamba, Gola-Zinga.

On the Atlantic Coast it extends from the *Rio Ambriz*, or *Embrige*, or *Rio dos Ambres** (amber or copal), to the *Cuanza River*, which separates it from Benguella. Toward the interior it reaches to the countries of the *Molluas*, *Jaga-Cassange*, and *Dala Quicua*. According to the approximate estimate, in the work of J. José de Lima, the total population of this kingdom was 246,009, of whom 1,740 only were white, including 154 women. The further particulars of the population will be given in the notice of Benguella hereafter. The country is necessarily very varied in its aspect. The features of the coast will be subsequently described. The productions are cotton, sugar-cane, indigo, rice, coffee, cocoanuts, castor oil seeds (vulgo, carrapateira), gum copal (called *mucocoto*), tamarinds, tobacco, urzella† of Angola. The kingdom of Angola is politically divided by the Portuguese into six presidios and four districtos, the capital being S. Paulo da Assumpçao de Loanda.

CAPE JUMA, or **Foreland Bluff**, is the North point of the bay of the same name. Behind and beyond the land above the cliffs is a group of hills, the southernmost of which, of a table form, called the Table of Juma, is the highest, and is the best mark for the Cape and Bay of Juma.

The table land of Juma may always be easily recognized from whatever direction you approach it; 25 miles off it always has the same appearance. South of Cape Juma the coast curves inwards gently, to form the Bay of Juma. This bay is 5 miles wide between its two points, and is rather a mere indentation of the coast than a bay. From Cape Juma the cliffs continue to be seen for a distance of 3 miles; they are lofty, peaked, and so little broken on their face that they might be taken for a great white wall, were it not for some slight fissures on the very top of them. To these cliffs succeeds a fine sandy beach. extending as far as the South point of the bay, on which may be seen numerous canoes drawn up high and dry.

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* The limit of Angola to the North has been placed formerly at the little River Lifune (or Onzo); but the interior possessions do not accord with this limit, and therefore it is placed at the Ambriz River, as stated above.—(See J. J. de Lima's Ensaio, &c., livro iii., parte i., capit. i.

† This plant was first discovered in 1835, and in 1838 the first bales were imported into Lisbon. In 1845, above 8,000 quintals were exported. This urzella differs entirely in its nature from the lichen rocella and orchilla of the Cape Verdes and Canary Islands. That from Angola is a parasitical plant, growing on and destroying the trees.

AMBRIZETTE.—The factory station of Ambrizette is a little North of this sandy beach, at the foot of the Table of Juma, to the S.W. of this hill. The Portuguese factory is likewise on the right bank of the River Ambriz, which falls into the Bay of Juma, at the North part of it. The river appears to run eastward, and is a quarter of a mile wide near its mouth, which is barred by sand, like almost all the rivers on this part of the coast.

You can anchor in the Bay of Juma, with the table land of Juma bearing E. by N., 5 miles from land, in 9 fathoms, sand and gravel; or on the same bearing in 6 fathoms, 3 miles from shore.

On the parallel of the River Cousa, 9 or 10 miles out, you find 25 fathoms, bottom of muddy sand; at 18 or 20 miles, 40 fathoms, sand and coral bottom.

The neighbourhood of the Bay of Juma abounds in fish. The best depth for fishing is in 18 fathoms, gravel and coral bottom. In 4, 6, or 9 fathoms, muddy bottom, you find no fish.

From the South point of the Bay of Juma the coast runs S. ¼ W. for 14 miles as far as the point called Double Headed Cliff. For this distance the shore is throughout of white cliffs, high, and slightly undulating, forming at their foot numerous points, between which are small bays. Trees crown their summit; and in the second range there is, farther inland, a range of still higher hills, running parallel with the shore.

Double Headed Cliff is a point projecting slightly, and only recognizable by some heights lying back in the interior, and near to it is the North point of a very small bay, along which the cliffs are very low; but they rise again high and abrupt at the South point of the bay, on which a cross is erected. This point is one of the most distinguishable on the Congo coast, by the hills which are seen a little to the South of it, and which serve as a mark for the shore, and the villages of Ambrizette, in the neighbourhood. These heights, called the *Aravat Mounts*, run 5 or 6 miles nearly parallel with the shore; they are rocky, steep, and have no vegetation but some brushwood. They are of a basaltic nature. On the summit of the most northerly of them is a high peak of basalt, which is very conspicuous. More to the South, another rock has a fancied resemblance to the shape of the celebrated hat of the Emperor Napoleon. The slope of these hills towards the shore is very gentle, and it reaches it with undulations, in the hollow parts of which, in the midst of the trees, some huts are discernible. The neighbourhood of the hills appears to be thickly populated.

Six miles South of Double Headed Cliff is the North point of the Ambrizette shore. Between the two points the coast is everywhere of whitish cliffs, terminating at the very point of Ambrizette. A sandy beach succeeds, and forms some slight indentations, which are improperly called the Bay of Ambrizette. This beach extends for 4 miles, and ends 2 miles to the North of a small river, called Rio Doce, situated 10 miles in a straight line from the peak of the Aravat Hills.

In the East of Point Ambrizette, a short distance from the shore, and on the South slope of the Aravat Hills, stands the principal village of Ambrizette, and some large barracoons or factories belonging to the Portuguese; another village and some barracoons are found more to the South, opposite the sandy beach. This one is in lat 7° 44′ S., long. 13° 1′, according to M. Kerhallet. The southernmost of these villages stands near the end of the sandy beach of Ambrizette, 2 miles from the mouth of the Rio Doce. This village, the houses of which are of a conical form, is very striking, by its colour being brighter than the dark green of the trees which overhang it. The land hereabouts is of a yellow hue, and contrasts strongly with the green country which is seen South of the mouth of the Rio Doce.

The RIO DOCE (or LOZE, or *Loge*) is an apparently insignificant watercourse, and appears partially barred by sands. The North point of its entrance is low and very woody; and the wood which renders it most striking is of a very dark green colour. Above the wood some undulating hills are visible.

The South point of the entrance is high, and formed by a whitish cliff, which is surmounted by a green plateau. It is perpendicular; and on the summit are two palm trees, from which it takes the name of *Cape Palmas* or *Bosquet*. It seems that these trees have been there a long time, for we find a similar name for this point on the charts ever since 1790, and the palm trees are also marked on them; on these charts it is called Point du Bosquet, or Grove Point. The entrance of the river is called by the Portuguese the *Porto de Sangano.*

The Rio Doce is very narrow at its entrance, and it seems to wind in a N.E. direction to the foot of the hills of which we have spoken.

The cliff, which forms Cape Palmas, is scarcely a mile in extent, and then the coast becomes sandy as far as the mouth of the River Loze, impropely called by Europeans, as M. Kerhallet says, the River Ambriz, which lies 5 miles from Cape Palmas.

The RIVER AMBRIZ,* which lies at the bottom of the bay of the same name, may be recognised by the brighter green colour of the trees around its mouth; the trees are also loftier. This watercourse, formerly rather considerable, is now unimportant, and will scarcely admit small boats.

The North point of the Bay of Ambriz is low, sandy, and skirted by a bank on which the sea always breaks. It is called North Breakers Point, or Point Loze. You should always give this point a berth of 2 miles, in order to escape the sandbank. It lies 3 miles N.N.W. ¾ W. of the mouth of the River Ambriz.

The South point of the Bay of Ambriz, 4 miles distant from the preceding, is called *Strong Tide Corner*. It is a high, perpendicular cliff, of a whitish colour, and on its summit are some European factories. It has also some shrubs on its summit.

You must keep 3 miles to the West of this point, in order to avoid the bank which runs round it 2 miles out to the West, and on which the sea usually breaks very strongly. This same bank extends North of the point 2 miles out, and in some measure closes in the Bay of Ambriz on this side. Even very small vessels cannot moor on the East of this bank, on which there are 3½ and 4½ fathoms of water.

On leaving Strong Tide Corner and proceeding to the North, the bay runs in slightly, and shows a fine sandy beach as far as the River Doce. The shore is covered with tall trees and verdure. Above this line is discovered, some distance inland, a chain of hills running E.N.E., which appears to be a ramification of some more distant mountains running North and South. They appear to be of granitic formation, and are dotted here and there with scanty herbage and stunted shrubs. The Ambriz runs at the foot of these hills; the scenery on its banks is very grand. Numerous villages occupy the gentle slopes down to the river, the most remarkable and important being named *Koro, Kouanda, Kiverna, Baram-Poutou, Bonga-Bonga, Moundelé, Goundou, Vinda, Jouanna, Efouni, Kassi, Gombé, Antoniv-Nasso, Serné, Embé,* and *Foula-Baman.* The River Ambriz, above the bar which encloses it entirely, is tolerably deep, and has 12 feet water; it is navigable nearly to its source.

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* Respecting the nomenclature which M. de Kerhallet adopts on this coast, differing, as was before stated, from that previously in usage, the following note in the Manuel de la Navigation, &c., page 135, will explain the variations which it is necessary to notice here.

"We here replace the correct names, to avoid the confusion which navigators have caused on this part of the coast, to which is owing a number of errors and mistakes.

"The River Ambriz falls into the Bay of Juma. The factories of Ambrizette are on this river.

"The River Loze falls into the Bay of Loze; there is no village of the name of Ambriz in the Bay of Loze; there are only the European factories.

"Lastly, the villages of Ambrizette are situated 26 miles to the South of the factory of that name, between it and the Bay of Loze."

In referring to the map drawn up by Capt. J. J. de Lima in 1846, to accompany his work on these Portuguese colonies, we find that the details, though somewhat imperfectly delineated, will accord with *previous* names, if our views are correct; thus, a few miles to the North of the River Ambriz, or Dos Ambros, in or about lat. 7° 40′, we find the Rio *Loge* marked as falling into the Porto de Sangano, and no notice taken of the Rio Doce, whose place it occupies. Therefore, presuming that Loge or Loze, which would be pronounced nearly alike, is but a corruption of Doce, we have retained the previous nomenclature, considering these latter names as identical.—*Ed.*

The word *Ambriz*, or, as the river is called by Pimentel, *Dos Ambres*, may be derived from the copal gum resembling *amber*, abundant here.

Coming from the North, in order to make this anchorage, you must round Point Loze, or Breakers, at a distance of 2 miles, and then cast anchor in 8 fathoms of water, with the factories on Strong Tide Corner bearing S.E., and the mouth of the river East. Coming from the South, you must round Strong Tide Corner at a distance of 3 miles, and then proceed northward until you have the bearings as above, so as to avoid the bank around this point. The winds are generally from S. to S.W. The current sets to the N.N.W. at the rate of 1 mile an hour. At this anchorage you have alternate land and sea breezes; and the roll of the sea being from the S.W., the vessel often gets across it, and consequently labours a good deal.

In order to land, you must first make for the entrance of the river, to within 100 yards of the shore; you must then run along shore to the foot of the cliff which forms Strong Tide Corner, where landing is easiest. It is always wise to do this, because on the bank to the North of Strong Tide Corner, although from 21 to 26 feet are found on it, there is sometimes a swell heavy enough to capsize or swamp a small boat; and during the rollers, which frequently set in, the sea breaks on the bank throughout its whole extent. At the anchorage in 7 fathoms, on the parallel of the entrance of the river, the waves begin to break at the distance of one-third of a mile to the East of the anchorage. As you proceed North of the parallel of the entrance of the River Ambriz, you can approach nearer to the land; and ships can anchor even in 20 feet, but it is dangerous, and the swell is then very strong.

During heavy rollers you cannot communicate at all with the shore; when they are less violent, landing may be effected by passing between the breakers on Strong Tide Corner and the shore. At the foot of the point the sea does not break, but a canoe is indispensable even then for landing, on account of the surf, which is very strong.

East of the high land which forms Strong Tide Corner there is an immense marsh, extending several leagues inland, on both sides the River Ambriz, which becomes navigable after passing this swamp. It renders the Bay of Ambriz very unhealthy, through its dryness in the fine season, and the mists which arise from it during the season of tornadoes. The sea reaches it at spring tides, and it abounds in fish. Sea birds also collect there in vast numbers.

By night the coast is covered with a thick fog, which fills the lower strata of the atmosphere, leaving the sky perfectly clear. The dews are abundant, and the East wind is comparatively very cold.

At the anchorage in Ambriz Bay there is no fishing; you must go 12 miles out for that; but in the morning you may fish with the net at the mouth of the river. Fresh provisions may be obtained, being brought down by the negroes of the interior. There is no village on the bay itself. The lawful trade consists in ivory, skins, wax, gum-copal, and some small quantity of copper ore. The illicit trade, and the most profitable, is that in slaves.

There are in Ambriz Bay two English, one American, and one French factory; they are built on the land which overhangs Strong Tide Corner. The Portuguese factories are in the interior, near a village in which the king lives.

In 1855 the Portuguese Government established a military post here, to check the slave dealings of the chief of Ambriz, and also to protect the legitimate commerce, chiefly in copper ore from the Mountains of Bembe, some distance inland, the produce of which were readily transported to the sea by means of the Rivers Loze and Ambriz.

The presidio of Bembe, called after the king, *Pedro Quinto*, protects these copper mines (of malachite). An English engineer and assistants were sent out in 1855, but they fell a prey to the climate. In 1857 they were superintended by a Portuguese, and were tolerably productive, but since then they have fallen off.

The Bay of Ambriz is very much frequented, especially by slavers, and the factories hereabouts are the most important on the coast; although they have been burnt once by the English cruisers, they have been rebuilt on the same spots. The trading huts are situated in the interior, and concealed in the woods; from these the slaves are transferred to others along the coast. In Ambriz Bay the trade is carried on on a a large scale, and immense capital is embarked in it. Each factory communicates with its subordinates by means of signals, which are exchanged as rapidly as by the telegraph. In this way they make it known along a great extent of coast, whether or not there are any cruisers near, the course the cruisers are taking, what direction they come from, and which way they are going; so that the repression of the trade is rendered immensely difficult.

Quitunga, or *Little Masula Road*, is S. ½ E. 10 miles distant from Ambriz. The *Little River Masula* (or *Mossul*) enters the head of the Bay, which is not more than half a mile wide between its two rocky points.

The village of Little Masula lies on a patch of land which surmounts the cliffs of the coast. You can anchor before it in 7 or 8 fathoms.

Mount Bamba, which appears quite separated from the other hills, when bearing East, is a hill of rounded form at the top, and with sloping sides, 3 miles N.N.E. of Little Masula. The land on the coast is parched, and bears only a few clumps of trees.

MAZULA BAY, or GREAT MASULA BAY, is 14 miles South of the former. The *River Onzo* (or *Lifune*) falls into the latter bay. On the left bank of the River Onzo stands the village of Mossul, or Great Mazula, visible from the sea, and having some American factories.* Between the Bays of Little and Great Mazula the coast is everywhere formed of white perpendicular cliffs, of uniform height, only cleft at the top in some places. A rocky reef stretches a mile off-shore, between the bays. The coast between the two bays presents a very remarkable appearance; it is, as we have just said, a line of precipitous cliffs, stretching South to the entrance of the River Onzo, the mouth of which is indicated by a deep fissure, the cliffs shelving down on each side, and by a mass of dark verdure which fills the fissure. Above the cliffs, the whole length of the coast between the two bays, there is a line of hills, some rounded and some pointed at top. They form two chains; the first, parallel to the shore and close to it, is called for distinction the *Seven Hills*; the second, 10 or 11 miles back in the interior, is more peaked, and has the name of the *Masula Hills*. These hills form an excellent landmark.

The *River Lusina* is 8 miles S.S.E. of Masula. The cliffs between these two ruins are still perpendicular. The land at the top is wooded.† The mouth of the

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* Mossul, or Masula, or Mazula, gives a title to a Portuguese marquis. The Marquez do Mossul is lord over the country between the Rio Loge (or Doce) to the North, and the Rio Lifune to the South. J. J. de Lima, Ensaiao, and Livro III., part ii., p. 22.

† In the charts of Capt. de Lima there is a mine of petroleum marked in the space between the Lifune and the Dande Rivers. The region about here appears to be carboniferous, for in addition to that alluded to, there are some "oil springs" up the River Dandé, in the mountains of Libongo. This asphalte or petroleum was known to the early Portuguese, who used it for calking and careening ships. It might be made available for fuel for steamers, being found at the entrance of the river, and at only about 24 miles from St. Paulo.

Lusina is distinguishable by masses of tall and beautiful trees, which line the shore for a short distance. It is easily discernible by these high trees, the hue of which contrasts strongly with the red colour of the land, and of the hills in the background.

DANDE.—The North point of the mouth of the River Lusina is the North point of the *Bay of Dandé;* its South point is called *Cape Dandé,* It lies S.W. by S. of the former, at a distance of 8 miles. Between the North and South points of Dandé Bay the shore is sandy. The bay forms two unequal indentations, quite distinct, and separated from each other by a high rocky point, 3 miles from Cape Dandé. Seen from the W.S.W., this intermediate point appears perpendicular. Above the sandy beach rises a line of hillocks, and trees fill the hollows of the land. The Masula hills are seen quite behind, 11 miles in the interior.

Cape Dande, the South point of the bay, is formed of a perpendicular cliff, lofty, flat, and barren at its summit. It descends perpendicularly to its base, which slopes down in an inclined plane. This headland is very prominent and bold, especially when seen from the W.S.W. From Cape Dandé the cliffs continue eastward for 3 miles, in the inner part of the bay, and then from the left bank of the river of the same name, which is indicated at its entrance by trees and mangroves. The river is quite at the South part of the Bay of Dandé, and the precipitous cliff which marks its left bank is spotted white and red.

The *River Dandé* is said to be navigable by good sized vessels, even for some distance above the town of the same name, which is situated 4 miles up on the left bank. This town, the first Portuguese establishment in the North, is an old station, which formerly had a great trade with the Brasils and the Portuguese Islands. It still has an active trade.

You can anchor in Dandé Bay, N.N.W. of the mouth of the river, in 10 fathoms, and along the shore at the bottom of the bay, in 9 fathoms, 2½ miles from the land. The bay is perfectly safe in these soundings, and no danger is known near the shore. N.W. of Cape Dandé there are 12 fathoms, 1½ mile distant. The River Dandé is the South boundary of the Province of Masula.

Cape Spilimberta, of the old charts, is a rounded promontory, 8 miles S. ¾ W. from Cape Dandé the coast between them consisting of high red and white cliffs. From hence the coast trends S. by E. ½ E. 6 miles, still formed of cliffs, to the commencement of the sandy beach of the Bay of Bengo.

BENGO BAY, or BANGO BAY, is the largest indentation of the coast between Great Fish Bay and Cape Lopes. It is bounded by Cape Spilimberta and Cape Lagostas, N.E. ¼ N., and S.W. ¼ S., 10 miles apart. In the North part of the bay the land is low and without verdure, presenting the same appearance so frequent to the South of this.

The RIVER BENGO debouches at the head of the bay, at 7 miles East of Cape Lagostas. It is indicated by some trees on the beach, and to the East of it rises a high hill. To the West of it, 3 miles off, is a large building, surrounded by houses; it is an establishment inhabited by Portuguese, from which the markets of Sto. Paul de Loanda derives its chief provisions.

The bay is much frequented by shipping, who anchor here to learn the state of affairs at the capital before proceeding there, and thus avoid the anchorage dues of that port, which are very high. The soundings in the bay diminish gradually toward the shore, being deepest on the South side. In approaching it from the North, keep Cape Lagostas half a point or a point to the East of South, to avoid the great bank extending to the N.E. of Loanda Island. In coming from the West, you must keep 3½ miles off Cape Lagostas, and bear to the North until Fort San Pedro, to the South of the cape, is in one with a country house (quinta), very conspicuous on the top of the cliff, bearing South, when you will have doubled the extremity of the reef off Loanda Island, and you may then proceed for the anchorage in the bay. The same directions also answer in coming from the South. You can anchor with Cape Lagostas bearing S.W., 4 miles distant, and the large building at the bottom of the bay South, in 14 fathoms; or you may do so within a mile of the cape in 16 fathoms; or farther in the bay to the North of the large building, in 7 or 7½ fathoms. This anchorage is useful to a ship which is proceeding to St. Paul when overtaken by night, or during a calm. The bay is clean throughout.

Cape Lagostas (Lobster's Cape) is the S.W. point of Bengo Bay. It is easily known, being a perpendicular cliff of a banded red, white, and greenish colour, and crowned with bushes. A mass of black and sharp rocks lie around its base. It is, however, quite safe, and therefore is the best side on which to approach St. Paul de Loanda.

PORTO DE LOANDA.—At 1¼ miles South of Cape Lagostas is the Fort of San Pedro (or Fortaleza de San Pedro do Morro da Cassandama), cut in the cliff itself, and some yards above the sea. Its walls are of a reddish colour, and it presents a formidable double tier of artillery.

"The port is formed by a low, narrow, and sandy island, 6½ miles in length, from N.E. to S.W., which forms a bay with the coast on which the city is situated. The distance between is about 1½ miles, and the water shoal, some parts being dry at low water, with spring tides. On the island are several villages. From its North end a hard sandy reef, nearly half a mile broad, extends 2 miles E.N.E. [*N.E.*] and upon a great part of which are only 12 feet of water. Cape Lagostas S.E. by E. leads just clear of its North end, in from 17 to 20 fathoms; and Bengo Point (low, but seen well out from afar), a little open to the left of the cape, bearing S. 36° E., leads nearly a mile to the N.E. of the reef and to the opening of the harbour. The situation of a pole on the North end of Loando Isle, as determined by the officers of H.M.S. *Leven*, in 1825, is lat. 8° 46′ 12″, long. 13° 9′ 18″. High water in the port, on the full and change, at $4^h\ 20^m$; rise 5 feet.

From Cape Lagostas the coast rounds half a league to the S.W., where stand *Fort San Pedro*, before mentioned, and a cenotaph. From this the coast concaves to the S.W. 4½ miles, to *Fort San Miguel*, which stands on the West of the town, and may be considered as the citadel. The depths in the harbour, to the distance of half a league from Fort San Miguel, are 17, 16, 14, to 11 fathoms, whence they suddenly shoalen to 12 and 6 feet of water.

From Dandé to St. Paul de Loanda, or its island, you may run with a S. by W. wind; but, if it blows hard, it will be found difficult; therefore you must go into Bengo Bay, which you safely enter as far as 10 fathoms, and ride there till next day; then you are sure of a land wind that will carry you to port.

Loanda Island. or rather peninsula, forms the port or anchorage of St. Paul. It is merely a sandy spit or bank, extending E.N.E. and W.S.W. It is now about 2½ miles in length from Fort San Miguel. It is very narrow and flat, but has above 1,200 inhabitants, chiefly blacks. There are some houses belonging to the more wealthy people of Loanda, with a number of gardens, and groves of palm trees. The arsenal is on the island, and some naval stores are kept here, including a *coaling depot.*

From the island being under the influence of the sea-breeze, it is very pleasant, and pic-nic parties visit it from the city.

From its N.E. extreme a dangerous shoal extends for 2 miles in the same direction, which requires the utmost caution, it being necessary to keep the shore of the mainland, the Morro das Lagostas, close aboard.

Although the head of the harbour is filling up, the sea is encroaching on the North end of the island, and it is said that the shoal is only the remains of the island, and that at the end of the seventeenth century a fort stood at the N.E. point, of which there is now only an accumulation of stones.

Loanda Island is so low, that it cannot be seen when you are in 12 fathoms; though beyond it you perceive the main land, which is higher. Being come so near as to see the island, you will, from the maintopmast, descry the whole of it, and the sea on the East side.

To SAIL into the HARBOUR of ST. PAUL DE LOANDA, when advancing from the northward, you may approach Cape Lagostas within half a mile, on a South bearing; then steer toward mid-channel to the W.S.W., and toward Fort San Miguel, which stands on an eminence West of the town. The fort should be kept a sail's breadth open to the southward of the N.E. end of Loando Island, passing over from 19 to 12 fathoms, until you get abreast of Fort San Francisco, standing on the East of the town, where you may anchor with good holding ground, in 10 or 12 fathoms. Vessels should not venture to pass beyond this fort, as the water shoalens very quickly above it.

In coming from the southward, keep well out to the northward of Loando, or until you open, on nearly a S.S.E. bearing, the bluff point in Bengo Bay, within Cape Lagostas, which you may then steer for, rounding the reef, and proceeding as before directed, nearly up to Fort San Francisco.

Curimba.—An inlet of the coast, at the South end of Loando Island, is called Curimba Cove, and is defended by a fort, San Fernao; but, according to Captain de Ville-sur-Arce, this passage is only fit for canoes. From this place the coast forms a lagoon, extending 5 leagues to the southward, and which is divided from the sea by a narrow strip of low, sandy land. From the bar of Curimba Cove the coast trends S.W. by W. [*S.W.* ¾ *S.*] 3½ leagues; and S.S.W. ¾ W. [*S.* ¾ *W.*] 7 miles, to a sandy point, called *Palmarinha Point*, on account of its palm trees, green and withered; and from which a sandy reef stretches off nearly 2 miles.

SAO PAULO DE LOANDA, or, to give it due honour, the *Cidade de Sao Paulo da Assumpçao de Loanda*, is the capital of the Portuguese possessions of Angola (by which name it is sometimes known) and Benguella. It stands at the head of the bay or port to which it gives its name, deriving it from the Island of Loanda, which shelters it to the West. It is divided into the upper and lower towns, the lower extending East and West along the beach, from the *Ponta da Izabel* westward, or, more properly, from the convent of *Nazareth* to the foot of the Morro of Sao Miguel, on which stands the fortress of the same name, the citadel of Loanda. Adjoining the Nazareth convent are the country houses of the richer citizens. To the suburb succeeds the *Praia do Bungo*, which forms a point seaward, readily distinguished by the cocoanut trees which shade it. Beyond this is a large collection of small houses, called *Quitanda Pequena* (little market). Passing the Praia do Bungo, we see the handsome customhouse, the quays, and the sheds which protect the boats, &c., of the arsenal. Behind these are the extensive cavalry barracks, fitted for 200 horses. To the left of this is the chapel of *Sta. Iphigenia*, the church of *N. S. de Remedios*, and to the extreme West the church of Corpo Santo. Near this is the *Quitanda Grande*, the chief market. From near to this the *Calçada Nova* leads to the upper city, and is lined with good houses. In the upper city, or cidade alta, the most healthy part, are the palace of the governor, the residences of the bishop and the principal functionaries, the churches of S. Joao (for the military) and of la Misericordia, annexed to the hospital, the cathedral, now partly in ruins. To the North of the governor's palace is the church of do Rosario, and beyond this that of S. Jose, which formed part of a convent coeval with the first conquest. Beyond this are the barriers of the city, outside of which are the *Maiangas*, or public tanks, which serve as a place of recreation for the inhabitants, and which also communicate with the *Passeio Publico*, formed on the point at the entrance of the port by the Praia do Bungo.*

According to the estimate given by Captain de Lima of the population, &c., there were, in the city, 1,176 hearths or fire-places; 1,601 whites (1,466 males, 135 females); 491 coloured people (230 males, 261 females); blacks, 3,513 (free males, 335, free females, 445); slaves, males, 1,073; slaves, female, 1,660; or altogether a population of 5,065 souls.

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* Ensaios, &c., por J. Jose de Lima, livro iii., parte ii.

Loanda was reached by Dr. Livingstone in June, 1854, in his remarkable journey across the continent with his Makololo followers, and from this he crossed over with them to Quilimane, at the mouth of the River Zambesi, on the shores of the Indian Ocean. He says: St. Paul de Loanda has been a very considerable city, but is now in a state of decay. There are various evidences of its former magnificence, especially two cathedrals, one of which, once a Jesuit college, is now converted into a workshop, and in passing the other we saw, with sorrow, a number of oxen feeding within its stately walls. Three forts continued in a good state of repair. Many large stone houses are to be found. The palace of the governor and government officers are commodious structures, but nearly all the houses are composed of wattle and daub Trees are planted all over the town, for the sake of shade; and the city presents an imposing appearance from the sea. It is provided with an effective police; and the custom-house department is exceedingly well managed. All parties agree in representing the Portuguese authorities as both polite and obliging, and if ever any inconvenience is felt by strangers visiting the port, it must be considered the fault of the system, not of the men.

The harbour is formed by the low sandy island of Loanda, which is inhabited by about 1,300 souls, upwards of 600 of whom are industrious native fishermen, who supply the city with abundance of good fish daily. When a high south-west wind blows, the waves of the ocean dash over part of the island, and, driving large quantities of sand before them, gradually fill up the harbour. Great quantities of soil are also washed in the rainy season from the heights above the city, so that the port, which once contained water sufficient to float the largest ships close to the custom-house, is now dry at low water. Nearly all the water consumed in Loando is brought from the River Bengo in launches, the only supply that the city affords being some deep wells of slightly brackish water.*

The city is strongly fortified, and these safeguards are still in good preservation, but the city looks like a bombarded place, the ruined houses and churches falling to pieces in all directions. M. Valdez, who came here in 1855, describes the forts that are passed in entering:—

The first is the four-gun fort of Nossa Senhora da Conceiçao, next the fortress of St. Pedro do Morro da Cassandama, erected on a hill about half a mile to the South of Morro das Lagostas, at the entrance of the bar, and lying, East and West, opposite to the cape of the Island of Loanda. The fortress of St. Pedro was commenced in 1703, and finished in 1705. It contains suitable accommodation for the governor, besides officers' quarters, barracks, magazine, and a tank.

Next is the beautiful fortress of St. Francisco do Penedo, which takes its name from a rock near the beach, on which, in 1687, was originally constructed a small fort of four guns. But in 1765, Dom Francisco Innocencio de Souza Continho undertook to unite this rock with the main land, and in seventeen months he succeeded in raising above the waves the handsomest fortress of Angola, built on the Vauban system, of an irregular Pentagon, surrounded by two batteries. The higher and superior one has twenty-four guns, and the lower one has, between wind and water, thirty-seven guns. This fortress has complete command of the entrance to the port, and of the anchorage; it also commands the road leading from the Cacnaco to the church of Nazareth, by which road provisions, &c., are conveyed from the country to Loanda. This fortress is the depot for all the gunpowder brought to Loanda, the merchants paying for storage at the rate of 1s. 5¾d. per barrel. Inside the fortress is the residence of the governor, who has also another splendid mansion, surrounded by gardens, outside the bridge leading to the beach, and opposite the fortress.

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* Missionary Travels, &c., in South Africa, by David Livingstone, L.L.D., D.C.L., 1857, p. 394.

The last is the fort of St. Miguel, which is erected on a green luxuriant hill, and commands the town, the sea, and the island ; it is also built on the Vauban system. This fortress consists of an irregular polygon, following the shape of the hill of St. Miguel, formerly called St. Paulo, from which originated the name of the town of St. Paulo de Loanda. On the inland side are two good bastions, with ten guns each, which cross fire with the battery Do Cavalheiro, which has sixteen guns.

This fortress is celebrated as being the place where, on the 15th of August. 1648, seven years after they had taken the city, the Dutch capitulated, and, surrendering the fortress into the hands of the Portuguese, vacated Loanda.

In consequence of the town being taken on the 15th of August (Lady-day), it received the name of " St. Paul of the Assumption of Loanda," and in commemoration of this event the municipality annually celebrate the 15th of August.

Captain Owen was received at the port with great civility by the governor and officers, but the inhabitants would render no assistance, and water was not obtained without difficulty.

In the Narrative of the Expedition, this place is described as follows :—

" The city was erected by the Portuguese in 1578 ; it is large, being a bishop's see, and contains several churches, with many private and public buildings, but many are in ruins or a state of decay. The lower town skirts the shore of the harbour, and consists princially of mean hovels, the residences of the free black portion of the population. The principal commerce consists in slaves (if possible), ivory, and bees' wax ; the last is procured in great quantities from the interior at a low rate, and sold in Portugal and other Catholic countries at an exorbitant profit.

" The market is tolerably well supplied, especially with fruit and vegetables. Bullocks and goats are plentiful but dear, the former costing about 20 dollars each.* The River Bengo supplies the town with excellent water, which is daily conveyed to the city in tank boats, at the rate of 2 dollars per ton."—*Captain Owen.*

When the Dutch had possession of the country they endeavoured to construct a conduit from the River Coanza at its confluence with the Lucala, so as to convey its water to Loanda. But it was given up on account of the cost.

In former days labour was much more easily procurable than now. Since the abolition of the Carregadores, or compulsory labour at stated fees, there has been much difficulty, and it is considered that although morally right, yet that it has done much harm. Sailors should not be allowed much, or any, liberty on shore, as drunkenness is very prevalent, and cases of stabbing abundant.

The Climate of Loanda is in marked contrast to that of Quiloa, Zanzibar, &c., on the Eastern Coast of Africa, in the same parallel of latitude. The trade winds and monsoons of the Indian Ocean bring on to the latter shores a vast amount of rain and cloud, which make the climate generally very damp and unhealthy. On the western coast, on the other hand, the trade winds having to cross the whole breadth of the continent, deposit their superabundant vapours, and reach the Atlantic coast as comparatively dry winds. Consequently the regions of Angola, Loanda, &c., are much more healthy.

The sun in October, passing through the parallels to the Tropic of Capricorn, occasions most intense heat, attended with light rains, seldom lasting more than ten or twelve days; and the medium temperature in this month is from 120° to 130° of

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* Vegetables are plentiful, but large and tasteless; the tomatos are excellent. As a rule oranges are the only fruit. There is only one *good* well in the town, and that is monopolized by the government and officers.—(*R. F. B.*)

Fahrenheit. The heat then declines about 104°, which is considered as the medium temperature during the months of December and January, after which it gradually increases with the return of the sun to the North, until November, when the atmosphere becomes heavy and warm, with hot gales from the East. Then it is that Europeans are most affected; during the months of March and April, which was the season in which I first visited Calumbo, the great rains fall, and after this ague, dysentery, and inflammatory diseases—especially what is called *carneiráda*, which is so fatal to Europeans—become prevalent.

The winter season is from June to September, and is considered the most healthy; it is termed the Caçimbo, which signifies cool weather. During this the atmosphere is quite clear from about ten o'clock in the morning until sunset, with cool refreshing breezes, the heat seldom exceeding 88° fahrenheit. The people have a traditional conviction that the Caçimbo commences as early as the 15th of May.

This is also the usual harvest season, when the rains have fallen at the ordinary time. The rains, however, are in general not so heavy here as nearer the equator; neither are the winds so high, nor the thunder so frequent and so loud.

The whole of the Island of Loanda, and of the bank which stretches off from Point Palmarinhas, is safe, and has a considerable depth of water close-to. To the N.E. of Point Palmarinhas is the Portuguese establishment of *Tanza.*

Coanza, or Sleeper's Bay, is a slight indentation of the coast, the South point of which scarcely projects from it, lying S.E. by S. ¼ S. 6 miles from Point Palmarinhas. At the bottom of the bay is a small sandy beach, and the bay may be known by a high, dark-coloured wood in its centre, near the beach. In its northern part are two hills, called the *Paps.* You can anchor in it in 6, 7, 8, and 9 fathoms, oozy bottom. The South point of Coanza Bay is the North limit of another bay called *Nicephas Bay,* which will afford anchorage from 8 to 9 fathoms. Its South point is called *Molli Point,* in lat. 9° 20′ S., long. 13° 6′ E. It is densely wooded, and owes its name to a small Dutch fort which formerly existed on it.

The COANZA RIVER is a very considerable stream, of which we know but very little. Its upper branches have been traversed by Dr. Livingstone, in his journey in 1853, 1854; but of its navigable state we have but few remarks. Point Molli is its North point, the entrance being about 2 miles wide, the current issuing from it being exceedingly rapid. At the distance of 3 or 4 leagues off, the sea is discoloured by its muddy waters. The mouth of the river may be known by the Paps (or *Mamas*) above mentioned, and also by an island on the middle of the bar, densely covered with trees. The banks, &c., which form the bar, are shifting, and consequently no permanent directions can be given. To the same cause is owing the existence of several islands in the mouth of the river, which show signs of having been once inhabited, but now only frequented at times by fishermen. The bar of the river frequently breaks throughout its whole extent, and to enter the river it is doubtless necessary to await a favourable time. A boat should not attempt it. Small vessels drawing at most 8½ feet can enter it, and penetrate a considerable distance up the river. Its direction appears to be about E.S.E., or *East,* true.

Along the course of the river the Portuguese have several establishments and districts, of which the new district of the Duque de Bragança, in the Ginga country, 360 miles from its mouth, appears to be the most remote. Many of these presidios are very old, dating from periods soon after the first conquest, but of the present nature of which we have not many particulars, those most recent and authentic being given in the works of Captain de Lima, in 1846,* and the works of M. Fran. Travassos

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* At about 2 leagues from the entrance is the island of *Quinzanga,* which has a few houses on it; and abreast of it, on the North bank, is the Portuguese village of *Calumba,* one of the earliest establishments. A RAILWAY has been proposed to Calumba from Loanda! At 90 miles above the entrance is the *Presidio of Muxima,* founded in 1599, which rules over a population of 9,168, including 13 Europeans. At 35 miles above this, on the opposite or

Valdez, Africa Occidental, Noticias, etc., Lisboa, 1864; and Six Years of a Traveller's Life in Western Africa, London, 1861.

The Coanza is the southern limit of the kingdom of Angola.

THE GOVERNMENT OF BENGUELLA.

Benguella, or Benguela, a province of the Portuguese dominions extending from the Cuanza River, or by some, from the Rio Longo, to Cape Negro in the deserts of Cimbebasia, has a coast of 440 miles in length. In most European works it has been termed Benguela; by the Portuguese authorities it is spelt Benguella.

The Portuguese obtained their first Possession here on the site of the present capital, in 1617, when the Governor of Angola, Manoel de Cerveira Pereira, established a fort, and subsequently obtained for himself the title of Conqueror of Benguella.* At the present time the country is divided into three presidios and four districts, which contain an estimated population of 140,514, divided as follows:—whites or Europeans, 92; coloured or mulattoes (slaves and freee), 3,232; negroes (slaves and free), 137,190.

It must not be supposed that the Portuguese Government have authority over all the people enumerated above; as in other cases the sovereignty is merely nominal. In former times, when the slave trade was actively and profitably pursued, this possession was rich and flourishing. Since the activity employed in its suppression, it has sunk into great wretchedness and depression; the trade in negroes is still pursued in an illicit manner, commerce having no existence, with the exception of a few exports of ivory, wax, gum-copal, and some skins. Cultivation is strictly limited to the necessities of the population.

CAPE LEDO, or MERRY CAPE, in lat. 9° 46′, long. 13° 12′, is about 10 leagues S. by W. ½ W. from the mouth of the River Coanza. This cape is a high, rugged promontory, with straggling trees, projecting into the sea; to the northward of it, about 4 leagues, and as far as *Black Rocky Point*, the coast is all steep hills and verdant land. There is a sandy cove called *Massoté*, close to that point, which affords

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North bank, is the *Presidio of Massangano*, founded in 1580-3, standing on a tongue of land at the confluence of the Cuanza and *Lucala* Rivers. The fort is regularly constructed. The population of this presidio is 13,114, including 22 Europeans or whites. The *Presidio of Cambambe* is 40 miles above this last, and has a population of 21,546, including 10 white people. It was founded in 1604. This is the limit of the navigation of the river from its mouth, for 30 miles above Cambambe there are some large cataracts and rapids. Between Cambambe and Massangano, on the North bank of Cuanza, the famous fair of *Dongo* is held. The next presidio is that of *Pedras de Pungo an Dongo*, containing a population of 10,291, with 33 whites or Europeans. It was the ancient capital of the kings of Dongo, and taken by Portugal in 1671. The fort is 5 miles from the North bank of the river, and 20 leagues E.N.E. of Cambambe. It stands in a superb situation, in the midst of a country of wonderful beauty and fertility. It occupies the luxuriant summit of a sandstone rock, inaccessible, except by a cavern through it to the fort. The fantastic forms of this rock remind the traveller of the ruins of an Egyptian temple. The last presidio on the river, 360 miles from its mouth, was founded in 1838, and named *Duque de Bragança*. It is the conquered districts of *Quiloange Quiassama*, taken from the King of Ginga. It is stated to be healthy and fertile. Of its population very little is known, but is supposed to be about 20,000.

We have extracted these particulars from the "Ensaio Statistico" of Capt. J. J. de Lima, livro iii., parte i., p. 4; and parte ii., cap. i., pp. 11 et seq.

* The relation of this conquest will be found in Captain J. J. de Lima's work, livro iii., parte ii., p. 27.

but little shelter, and at the head of which is the mouth of a small river, now called *Suto*. Near this is the best landing-place, at a small factory.

Cape San Bras.—At 5 leagues S. ¼ W. (*S. by E. ¾ E.*) from Cape Ledo is *Cape St. Bras* (St. Blaize) which appears like Portland in the English Channel. The shore between forms a slender bay, which is bordered by remarkable white white cliffs; the soundings are regular, with 10 fathoms, 2 or 3 miles off-shore. On the North side of Cape St. Bras is a sandy cove, where you may anchor in from 8 to 4 fathoms. To the North of a white cliff is the mouth of the small river Quesimi (qy. Quissama).

"I anchored with Cape San Bras bearing S.E. three-quarters of a mile. I found a very long rolling swell. I took the master sounding with me, and found 6½ and 7 fathoms water within a quarter of a mile of the cape, and 4½ fathoms within half a cable's length of it, with the same depth all round the bay near the beach. I discovered a spit of sand running out at the head of the bay, about a quarter of a mile in length, with deep water close to it on either side; inside the spit there is a beautiful snug little harbour, about a quarter of a mile long, and 3 cables' lengths broad, with 2½ and 3 fathoms water nearly the whole way up. The harbour is full of fish; the only afternoon I was there, I hauled the seine, and caught a great quantity of Cape salmon, flat fish, lardines, soles, nine sharks, and ten sword fish. I did not see any Portuguese settlers there, but a few blacks from the country, who seemed inclined to be very friendly and anxious to trade."—Commander P. H. Dyke, R.N.

Cape Longo.—From Cape St. Bras the coast trends 11 leagues S. ¼ E. to a bluff headland, named *Punta da Longa;* at some distance southward of which is the mouth of *Rio Longo*, the entrance of which is in lat. 10° 19′ 30″ S., long. 13° 31′ E. This has been a general rendezvous for slave vessels from Benguela and St. Paul de Loanda, from which place the slaves are marched overland. There are no inhabitants; but lions, tigers, deer, and other animals exist in great numbers. This is considered to be the southern limit of the Government of Angola.

Cape Benguela Velha (*Old Benguela*), sometimes called the THREE POINTS, is 33 miles S. ½ E. from Ponta Longa. It is a high, steep, perpendicular point, projecting considerably from the coast. On its summit is a large village, and some factories are established in the bay formed to the North of it, but it is now an insignificant place. Within the cape the coast trends to the East for 6 miles, which on the old charts is called Bahia, or Praia Longa, which is limited by *Ponta Morena*, the South point of the mouth of the Rio Longo. The coast is all safe.

Rio Cubo.*—At 9 miles South of Cape Old Benguela is the North point of the entrance of the *Rio Cubo*, with an uninhabited island, nearly 3 miles in length, in the mouth of it. According to M. Kerhallet, this embouchure is common to the Cubo and the *Rio Moroa*; but in the work of Captain de Lima no mention is made of such a river. The Rio Cubo is a very large river, and said to be 300 miles long, running first N.W., and for the last 100 miles to W.S.W. At 12½ miles from the Rio Cubo is the village of *Kingo* or *Quingo*, where seven large factories are established. Landing is very difficult here, but this does not prevent vessels from embarking their cargoes; but getting wet in these countries brings fever.

NOVO REDONDO.—This fort, which was founded in 1769, and rebuilt of stone in 1785, is in lat. 11° 12′ S., long. 13° 51′ 30″ E. This place was erroneously laid down by Capt Owen, who places it to the S.W. of its true position. The town is considered to be the third, in point of size and consequence, in the Portuguese possessions, but the fort appears to be in a very dilapidated state. Stock of all kinds may be procured here, but no water. You can seldom land, excepting in the surf boats, a number of which are always in readiness on the beach, though not always at the service of the British officers. The best anchorage is with the Fort bearing E.S.E., in from 4 to 7 fathoms. The town may be known by the large white houses on the hill, or at a greater distance by the very high mountains behind it.

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* Called variously *Rio Curo, Cuba, Coubo, Cuevo.* The entrance of the river was formerly called the *Porto de Sumbe Ambela.*

The *Rio de Novo Redondo*, called by Captain de Lima the *Rio Gunza* (or *Gunza Cabolo*), rises about 60 miles in the interior. It flows through a rich and thickly populated country. Before the fort is a bank, which is not mentioned either by Capt. Watson or Capt. Simon. It extends 3 miles to the West, and therefore vessels should keep off beyond that distance. Capt. R. de Rosencoat says that a brig struck on it, and was obliged to throw her guns overboard.

From Novo Redondo the coast runs nearly in a straight line to *Quicombo*, or Manikicongo, as it is called in the old charts and directories.

QUICOMBO.—The South point of this bay is in lat. 11° 20′ S., long. 13° 48′ E., off which there is a rocky shoal, on which the sea sometimes breaks, and which extends about a mile to seaward, or N.W. There is good anchorage in the bay, except during the time of the rollers or calêma, and then it is requisite to anchor outside the point. To enter the bay, you should keep the village bearing South or S. by W., when you may anchor at any convenient distance. The inner anchorage is with the village bearing S. by W.; the South point S.W. by W.; and the North bluff point N.E. by N.; or with the fort at Novo Redondo just shut in by the latter. On leaving the bay you should not come any higher than N.W., until you are well clear of the shoal off the South point. Here are several Portuguese factories for slaves, orchilla, gum, &c. Bullocks are very plentiful and very cheap, and water, though indifferent, is easily obtained. The bay may be known at a distance by a white road leading from the village over the mountains. It is 8 miles S.W. by S. from Novo Redondo. This bay is the more important to be known, as it is the only one from hence to Little Fish Bay, where water can be easily procured. It is easily made out in coming from the South by *Red Point*, which is 3 miles South of Quicombo, and by the mark given above. A vein of nitre has been discovered near the bay.

" Quicombo is a capital place for watering. Close over the beach near the village is a large sheet of water with a running stream, which comes from the mountains, where you fill your casks, and parbuckle them into the boat. I have been given to understand that, for about a couple of days after the full and change of the moon, the rollers set in so very heavy that it is impossible to communicate with the shore, much less procure water; therefore you ought to be careful, and not anchor nearer to the beach than 1⅓ mile, should you be going to stay over that time. I saw the French brig-of-war *Messager* go into what is called the inner anchorage, but was obliged to shift her berth out again immediately, in consequence of her rolling so heavily. Quicombo is about 8 miles to the southward of Novo Redondo. There is a reef that extends about 1 mile (and which constantly breaks), running out from the southern point of the bay, which is very bluff, and quite red, it being the only place near here where the land is red, so it cannot be mistaken. Close at the back of the village there is a large zigzag road, communicating with the interior, which is the most conspicuous mark of all.

" The bearings I took when anchored were:—Road on the back of the town S.S.E ¼ E.; southern point, S.S.W.; North point, N.E. ¼ E.; in 6¾ fathoms, a good berth but if anything, rather far out.

" There are a great number of bullocks to be got at fifteen dollars apiece, but as we had no necessary money on board, and the Portuguese not liking to take Government bills, we could not procure any."—Commander P. H. Dyke.

Quicinga (or *Quissinga Pequena*), in lat. 11° 29′ S., is a cluster of native huts; you can seldom land here except in surf boats or bimbas.

Whale's Head, in lat. 11° 35′ S., is a dark-coloured point, projecting about a mile into the sea from the land on either side, forming the North side of a small indentation, called Pigeon Cove; about 2 miles to the northward is a remarkable piece of table land near the beach. At 1 mile South of Pigeon Cove is a large barracoon, and several smaller ones mark the site of *Quicinga* or *Quissinga Grande.* At 9¼ miles South of this is the entrance of the *Rio Tapado* or *Egito*, rising near a town of the latter name, 60 miles inland. It is sometimes called *Egypto.* It is not easily made out. There are some barracoons or factories.

From Quicombo the coast runs S.S.W. ¼ W., 39 miles, to *Logito.* The shore is very bold, being formed of high, perpendicular, chalky cliffs, which are seen at a great distance when the sun shines to the westward of the meridian. You can run up the coast from Lobito to Quicombo, within a mile of the shore, without having soundings with the hand lead.

Logito River, in lat. 11° 58′ 30″ S., long. 13° 45′ 15″ E., is 25 miles N.E. by E. from Lobito Point. It is an excellent watering place when the sea is smooth; the water, coming from the mountains, is perfectly wholesome, and better than at any other place on the coast. The most expeditious plan is to haul the casks off to a boat anchored outside the surf, and then raft them off to the ship, which cannot approach nearer than 1¼ mile from the shore. Here is a Portuguese factory for slaves and orchilla. Logito may be known by the high bluff point which forms the South point of the Bay.

Anha or **Hoanha,** or *Morombo*, is a small river 9 miles E. by N. ¾ N. from Lobito Point; it runs into a small bay, which may be known by trees close to the shore. There are several Portuguese residents trading in slaves and orchilla. You may anchor in 7 fathoms, with the river S.E. by S. 2 miles.

Anha is a large village to the northward of Lobito, and apparently, from what I could see from the ship, far more luxuriantly situated than any other place along the coast. There is a large river running down through the village, which adds much to its appearance, but in consequence of the heavy surf which invariably sets on the beach, it is impossible for man-of-war boats to land and procure water, even under the most favourable circumstances.—Commander P. H. Dyke.

LOBITO * is a very excellent and secure harbour, the best on any part of the coast, but it has not hitherto been noticed in any chart or book of directions. It appears to have been unknown, excepting to the slave traders, until it was discovered by Capt. H. J. Matson, in H.M.S. *Waterwitch*, in 1840. Even the Portuguese vessels of war, and the military authorities, professed entire ignorance of such a place. An attempt has been made to remove the government establishments from Benguela to Lobito, and a fort and a customhouse were in course of erection. Water can only be procured in the rainy season; at other times it must be brought from Anha or Catumbela. Fish can be taken with a seine in great abundance. The beach on the N.E. side of the harbour is almost perpendicular, there being in most places 10 fathoms within 30 feet of low water mark. This harbour is not easily made out by a stranger, and a vessel might pass within 4 or 5 miles without perceiving the entrance. It may be known at a distance by a row of white marks on the hills to the northward; but the latitude (12° 20′ S.), or its bearing from St. Philip's Bonnet, E.N.E., 23 miles, is the only sure guide. It is high water here at $4^h 15^m$; rise, 6 feet.

"Lobito is a beautiful harbour, about 3 miles long, and 1 mile broad, with 10 fathoms all the way up, close to the western shore. In rounding Lobito Point, you may go within a few yards of it, as the beach is quite steep, with 10 fathoms water. In working up to the anchorage, you ought not to stand over on the eastern shore into less than 8 fathoms, as it then begins to shoal very suddenly. It is a good place to cut wood, but you must first obtain permission of the Governor of Benguela, who is a remarkably civil and obliging person.

" Bullocks and poultry are likewise to be obtained, and very good, the latter five or six for a dollar. Oysters are in great abundance on both sides of the river, at the head of the harbour, from the shells of which an immense quantity of lime is made, and I believe is principally exported to Benguela and St. Paul de Loanda. No water is to be got in the neighbourhood, otherwise it would be a famous place to heave a vessel down, or clear her out. In coming from the southward, you will see a rather large white building on the hill, which is the fort at Catumbela, and close to the northward of it there is a large niche in the land, which is very conspicuous, and is about 7 miles to the southward of Lobito Point. In coming from the northward or westward, you will see three white marks on the land joined together, which appear precisely like the arches of a bridge; they are close to the North side of the entrance of the harbour.

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* *Catumbella das Ostras*, of Pimentel, or Cotovelo das Ostras, is said by M. de Kerhallet to be a cove or village, 4 miles South of Logito; Captain de Lima and M. Valdez say it is the same as Lobito.

"The Portuguese Government were anxious a few years since (in 1842) to form a settlement there instead of Benguela, in consequence of its being so unhealthy, but were obliged to abandon the idea, after building some few houses, owing to not being able to find any water, and in addition to which it is also very unhealthy.

"There is about 6 feet rise and fall of tide; the head of the harbour at low water is perfectly dry, and the smell is by no means agreeable, particularly of an evening, when the tide is out. There are an immense number of fish in the harbour, sharks amongst the rest, so one ought to be careful allowing any person to bathe. I have seen five or six at once near the ship, and have had several in the seine, which have always broken through."—Commander P. H. Dyke, R.N.

The Rio Catumbella (or Cata-Bella), enters the sea at 9 miles S. by W. ½ W. of Lobito Point, and 10½ miles N.N.E. of St. Philip de Benguela. The entrance is barred, and is conspicuous from a remarkable opening in the hills, 4 miles inland, through which the river passes. It is most clearly seen when bearing East. A white fort at the entrance of this gorge also points out the river. Inland, the river has considerable dimensions, and is said to have a course of 60 leagues, rising in the South in the mountains of Caconda. It is subject to great inundations in the rainy season, and is very unhealthy.

S. FELIPPE DE BENGUELLA (or the Cidade de S. Felippe de Benguella), capital of the province or kingdom, was a place of considerable trade, and next in consequence to St. Paul de Loanda. It was the last of the Portuguese settlements on this coast; is frequented chiefly by the Brasilians, and is situated on a plain fronting the sea, containing about fifty houses, neatly built in the old Portuguese style, tiled and whitewashed, but composed chiefly of mud. A fort is situate to the left of the town, mounting twenty-eight pieces of small calibre, but in a most dilapidated state. There are two churches, but one is in ruins. The dress worn by the natives is a scanty piece of blue cloth thrown loosely round them, adorned with beads and various trinkets of European manufacture. Others are entirely folded in lion and leopard skins. The slave trade has been here carried on to a great extent, and the profit arising from the inhuman traffic is a strong inducement for its continuance. The governor encourages the trade by every possible means, but a night guard boat is constantly on the look-out, in order to prevent illicit communication.

The population amounts to 2,438, arranged as follows:—whites, 38 men, 1 woman; 85 males, 94 females, free coloured—179 in all; free blacks, males 560, females 510; slaves, males 520, females 630.

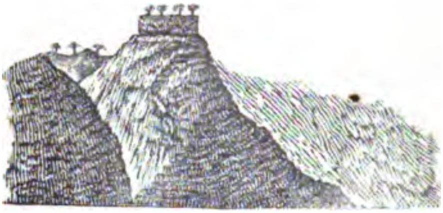
Capt. Matson (1843) says of this place, that it is in a wretched state of dilapidation and decay; the houses, originally only of mud, are now falling to pieces. There is scarcely any trade but that in slaves, and even that has been almost entirely suppressed by the British cruisers. The soil is perfectly barren, not the slightest appearance of vegetation, excepting near the River Catumbela. On leaving this anchorage, a vessel should not bring the town to bear to the westward of South, until she is 4 or 5 miles distant; she will then be clear of the shoal to the northward.

Elephants, lions, tigers, and various other wild beasts, are abundant in the vicinity, together with crocodiles, alligators, and numerous serpents, with other reptiles. In

December, 1825, no rains had occurred at the usual season for two years, and the inhabitants were entirely dependent upon St. Paul or Angola for the necessary supplies, instead of, as heretofore, furnishing that place with all kinds of provision. The anchorage is abreast of the fort, in 4½ fathoms, and three-quarters of a mile from the shore.

Of Benguela Bay, which was formerly called *Bahia das Vaccas*, or *de Sant' Antonio*, the West point is a most remarkable headland, called by the Portuguese *Punta do Chapeo;* and by our seamen, the *Bonnet of St. Philip.* It appears to be a clump of trees, which are so close and thick that they seem to have been cut with a pruning knife into the shape of a beefeater's bonnet; and, though they are luxuriant, all the neighbourhood is quite barren. The point on which they grow is considerably elevated, and can be seen at a great distance. It is composed of materials like those of the cliff below, and covered with shrubs and verdure. The land in the bottom of the Bay is double, high, rugged, and barren, except the valley close behind the town, which is covered with verdure.

The annexed view of St. Philip's Bonnet, at 2 miles distance, when it bore W. by S., was drawn by Captain Dazel in 1790. The trees at the top have since grown thicker, and now appear as one close mass.



St. Philip's Bonnet and the town of Benguela are nearly on the same parallel, at the distance of 6 miles from each other; but the bay, from its extreme eastern and western points, is 7 or 8 miles broad, and about 3 deep to the beach. Within the transit line of the two points, and more than halfway over to the East, the depth of water is 17 fathoms, and the depth gradually decreases to 6 fathoms within a mile of the shore. The best anchorage is with the flagstaff and western church in a line.

The country around abounds with excellent fruit and vegetables; but the water is not of the best quality, nor to be procured without some difficulty, by baling it from wells of considerable depth, at about 300 yards from the beach.

On nearing Benguela from the southward in November, 1825, the water, every evening, appeared to be nearly white; and, when agitated, emitted the most brilliant phosphoric coruscations. Here was picked up a number of molluscæ, possessing a perfectly new character, being shaped like the *biche do mar*, cylindrical, and terminating in a blunt cone, open at one end, and hollow as far as the conical projection. Some were a foot long by about 2 inches in diameter, perfectly flexible, and upon being placed in the hand gradually dissolved like ice; but when set in motion, either in or out of the water, became vividly luminous.

On the 30th of November, 1825, the *Leven* arrived at Benguela, and the following is Captain Owen's description:—The town is situated on an open bay, formed to the S.W. by a projecting point of cliffs, above which is *Monte Sombreiro*, known more generally by the name of St. Philip's Bonnet. The town is situate in a marsh of stagnant pools, which in the wet season is almost inundated, and, of course, very unhealthy. The natives in the interior will not allow the Portuguese, or *any other people with straight hair*, to enter their territory. No sheep were seen, but goats and bullocks were in great abundance; the latter of a small species. Lions and tigers are very numerous in the surrounding country, and hippopotami and alligators in a small river near the town; elephants common, but sometimes scarce.

After the vigorous efforts made to suppress the slave trade, Benguela declined very much, until it became a mere wreck, but legitimate commerce restored in some degree its trade. Wax, ivory, &c., are brought from the interior, and the copper mines have also been one of the sources of its prosperity.

The immense and desert coast between Benguela and the Cape of Good Hope is yet imperfectly known, and has not been perfectly surveyed.

To the West of St. Philip's Bonnet is a bay limited to the West by Point St. José, which is low and sandy. A palm tree stands about three-quarters of a mile within it, and is the only mark to distinguish it in coming from the West. The bay is 4 miles wide, and separated into two by a rocky point. To this bay the name of *Bahia Tarta*, or *Torta*, is given, but Captain Kerhallet limits this title to the West half, calling the East portion Bahia das Vaccas, which, as before stated, is the original name of Benguella Bay. The *Rio Marimbemdo* (or the Vittoria River) falls into it. There is excellent anchorage in these two bays. In one of these a boat belonging to the *Waterwitch* remained concealed for nine days, watching a slaver in Benguela Roads, which she captured, on her leaving the anchorage, with 390 slaves on board.

" Between Benguela and Point Salinas is the *Rio Vittoria*, or *River Victoria*, which is nothing more than a small creek extending considerably into the interior; the banks extremely beautiful, and covered richly with verdure. Near this place, in 1825, was seen a large herd of cattle, and shortly afterward, to the northward, a village, containing about thirty huts of the rudest construction, built of mud, the largest not more than 8 feet high, with a little oval-shaped entrance about 3. On the beach were several boats of a retangular form, and several natives, quite naked. Continuing along shore northward, many fishing canoes appeared, and another village of much greater extent and neater construction than the last. One house in particular was large, well built, and whitewashed; from which, and elephants being very numerous hereabout, it may be supposed that they have some communication with the Portuguese of St. Philip or Benguela."

Salinas Point is a piece of low, flat, sandy land, extending 5 or 6 miles beyond the high land, and has a remarkable tree at its extreme point, which much resembles a sail, and is frequently reported as such. There is a reef to the southward of it, and the water between it and Luash is shoal; but to the northward of the point the shore is very bold, there being 10 fathoms within a cable's length of the beach. It is, however, dangerous to approach it during the night; for the beach being of white sand, and projecting so far from the high land behind it, renders it difficult to be seen until very close. Many vessels have run on this beach on a fine, clear night.

To the northward of the point, at 5 or 6 miles distance, a settlement has been formed, where a large quantity of salt is made and exported, chiefly to St. Paul de Loanda and Benguela.

The coast between Salinas and St. Philip's Bonnet was not minutely surveyed by Captain Owen, or so imperfectly as to mislead strangers. This defect was oviated in some measure by the sketch made by Commander Alan Gardner, in 1853. The course from Salinas to St. Philip's Bonnet was given as E.N.E. ¼ E., but it is not possible to make a direct course between these two points; the land between them forming the segment of a circle. The English schooner *Harrington* was totally lost on this beach in March, 1843; she had taken the bearings of St. Philip's Bonnet at 6^h 30^m p.m., and at 7^h 30^m she was aground.

A stranger having made the high land of St. Philip's Bonnet before dark, bearing E. ½ S. or E. ¾ S. 5 or 6 leagues, would not see the intervening low land, and would perhaps steer directly for the Bonnet; or he would consider East to be a very safe course; but even this would take his vessel on the beach, off which there is no anchorage. One remark may be made, that the current will drift a vessel rather off the coast.

When St. Philip's Bonnet bears E.S.E. you may steer directly for it, and, having passed it at any convenient distance, proceed into Benguela Roads.

Loacho, or *Luash*, in lat. 13° 0′ S., long. 12° 59′ E., is a very strong harbour for small vessels, completely sheltered from all winds. It is here that the slave vessels belonging to Benguela generally embark their slaves.

" *Luash Bay* is a good anchorage, but in general there is a deal of surf on the beach. What I consider the best anchorage is in 7 fathoms, with the bridge bearing S. by W. ½ W. half a mile. The anchorage further in, under the lee of the bridge, appears occasionally to be good, with beautifully smooth water; but when the rollers set in (which is, I am given to understand, at the full and change of the moon), I think, from what I have seen, that even this vessel would almost touch the bottom, therefore do not consider it a safe anchorage for men-of-war. There are plenty of good bullocks to be got, but no water; and slaving is carried on to a great extent."—Commander P. H. Dyke, R.N.

Equimina or *Camena Bay*.—In lat. 13° 12′ S., long. 12° 53′ E., is a large bay, about 6 miles to the North of Elephant Bay; but ships going to anchor there should be extremely cautious in not having too much way on the vessel, as you do not get soundings until close in, and then from 15 fathoms rapidly to 3 fathoms, at about half a mile distant from the beach. There are two Portuguese establishments here.

"The first time I went there I got far too close in, and was obliged to warp further out, so ever since then I have invariably sent a boat in and anchored her in 8 fathoms, so brought the vessel to anchor close to the boat; but on one occasion, even then, although I dropped my anchor close to the boat, and only veered to 20 fathoms, I had only 4 fathoms under the stern.

"I found nearly in the centre of the bay, close down to the beach, merely the bed of a large river, but by digging holes in the gravel the water flowed in rapidly. I dug three each time, about 6 or 7 feet long and 3 deep, and although I kept filling casks and breakers during the whole day, the water did not appear to diminish in the least, and I must say, I think the water was as good as any I ever tasted. The best time for watering is the morning, before the sea breeze sets in, which is very irregular as to time; but after that there is often a nasty surf on the beach, which hinders the watering.

"In a couple of days I got on board this vessel 32 tuns. This country all around abounds with lions, zebras, and deer, which came down and drank at the places we dug, after our departure in the evening.

"The Rocella (scarlet dye) trade appears to be the only one, with the exception of that of slaves; and from what I could see, I strongly suspect there is a good deal of the latter carried on. I frequently saw small parties of ten or twelve brought into the place, guided by a few men armed with muskets. The land to the northward is steep, and quite white, apparently chalky soil, and terminates in a high bluff, which forms the northern entrance of the bay. The white cliff may be seen at a great distance, and after having once been seen, can never be mistaken."—Commander P. H. Dyke, R.N.

ELEPHANT BAY (*Bahia da Torre*) is one of the best anchorages on this part of the coast; it is perfectly secure, and sheltered from the only winds that blow, the South and S.W. It may be known at a great distance by a very high piece of table land near the bottom of the bay, and under which is the best anchoring ground; that nearest the eastern shore is rocky in some places. The rollers, or calêma, which occasionally set in along the whole coast, are not felt in this bay. Fish can here be procured by the seine in great abundance, and the hills abound in game and wild animals of all kinds, which, owing to there not being any inhabitants, are remarkably tame. This is by far the best place on the coast for refitting and refreshing the ship's company after a cruise. I have repeatedly anchored here for a few hours, merely for the sake of giving the men a run on shore, to wash their clothes, to bathe, and haul the seine. It is the only place where this can be done with impunity. The climate is very salubrious, as is the whole coast to the southward of Salinas. Before anchoring in this bay to refit, it would be as well to procure a bullock or two and some vegetables at Little Fish Bay (lat. 15° 13′ S.), which can be purchased there on very reasonable terms.

Water cannot be procured in Elephant Bay, excepting during a rainy season, which sometimes does not occur once in 5 years; there was not any rain whatever during the years 1840-41-42; but I have been informed that, when the rains do set in, they continue incessantly for weeks together, and the country then becomes almost inundated. The appearance of a large number of watercourses seems to corroborate this statement. The *Rio Coporoco* is marked as falling into it, and a Portuguese factory is established in the bay. Excellent oysters can be gathered from the rocks on either side of the bay.—*Captain Matson.*

The *Friar's Rooks* (*Os Frades*) are in lat. 13° 14′ S., long. 12° 49′ E., and are about 12 or 14 feet high.* Between them and Cape St. Maria is the village of Calunga.

"*Elephant Bay* is by far the best and finest bay all along the coast, with capital anchorage. I always anchored in 7 fathoms, about 3 cables' lengths fiom the high land, close up in the corner. The water is perfectly smooth, and the wind always blows off the high land. I took the opportunity of careening the vessel, and putting some sheets of copper on the bottom well under water. The only drawback to the place is the want of water, not a drop of which can be got even by the settlers for their own consumption; they are obliged to send to Cama Bay for it, a distance of 6 miles.

"Fish of all sorts are in great abundance. I frequently caught with one haul of the seine more than sufficient for the whole of the crew. During the time I was there I established a regular signal post on the hill, from which I could see at least 45 miles on a clear day; and should recommend others to adopt a similar plan, should they be going to remain any time there. In the neighbourhood of Elephant Bay the land is very mountainous, with flat table land, at the southern entrance of the rocks, called the 'Friars' Rocks,' with deep water close to them. In coming from the northward, the land, about 6 or 7 miles from the bay, appears quite white, like chalk, and may be seen for a considerable distance. There is not the slightest danger in approaching the land anywhere along the coast in that neighbourhood, as there is deep water close to the land all along.

"There is a rise and fall all along the South coast, of about 5 feet. The westerly winds generally prevail. The current, from what I have observed, *never* sets to the southward, occasionally to the eastward, but principally to the N.N.W. I was set one evening, when between Capes St. Maria and Martha, at the rate of 1½ mile an hour to the eastward.—Commander P. H. Dyke, R.N.

The coast northward of Cape St. Maria (on which is a pillar) forms another bay, the shore of which is steep, with a sandy strand; and here, at a short distance off, no bottom is to be found with a line of 50 fathoms. This is called *St. Mary's Bay,* and is destitute of fresh water. The *River Gubero* appears to be about 5 leagues to the southward of Cape St. Maria. The coast between is high and precipitous, intersected at intervals with deep ravines, apparently the channels of torrents during the rainy season; and there is a depth of 60 and 70 fathoms near the shore.

This part of the coast was visited by Captain Chapman, in H.M. sloop *L'Espiègle,* March, 1824, and communication had with the natives, who proved deceitful, and who seemed to have not the least idea of any language but their own, although so near to the Portuguese. Little cultivation of the interior could be seen.

CAPE STA. MARIA, the Cape San Roque of the old charts, is in lat. 13° 26′ S., long. 12° 35′ E. It is of moderate height, and surrounded by higher land. Some white patches, in the small bay of Sta. Maria, point it out from a distance. *Sta. Maria Bay* lies to the East of the cape; in it is a large white-coloured islet. A black rock, rising 50 feet above the water, called *Ilheo de Pina,* lies at 3 miles South of the cape. It lies off the mouth of the *Rio Padrao,* or *S. Joao.*

CAPE STA. MARTHA is 26 miles S.W. by S. from Cape St. Maria, and is of moderate height. Between these capes the old charts mark a river, the *Rio Gubero,* which was considered as the southern boundary of Benguela, but this is now placed at Cape Negro. The bay to the N.E. of the cape is called Bahia Vermelha. Some slave barracoons have lately been erected at Cape Sta. Martha.

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* The description of the coast between this and the Congo has been corrected from the observations of Commander H. J. Matson, H.M.S. *Waterwitch,* 1839—1843.

From Captain Owen's Voyage we learn that the *Barracouta* sailed round Cape St. Maria within about 50 fathoms of the rocks. On the western side of the cape were seen three beautiful coves or bays, capable of affording excellent anchorage. The mountains from this cape northward to Elephant Bay are of granite, interspersed with a great quantity of mica and quartz; one of the cliffs, abounding in the former, reflected the sun's rays to a considerable distance, like a vast mirror.

"Continuing her course toward Benguela, the *Barracouta* passed the low sandy point of Victoria, or St. Francis; after which several villages of straw huts were seen. Off one of these the sloop hoisted her colours, which the inhabitants acknowledged by holding up a small red flag, with a black or blue cross upon it. Here the country was generally much more diversified; the valleys fertile and beautiful, studded with huts, but which, from their rude construction, indicated no advance in civilization."

At 6 miles South of Cape Sta. Matha is a small unexplored bay, called *Bahia das Matillas*. On the chart of Capt. de Lima this is called *Enseada da Lapa*. It is sometimes called *Carangumba*, and a barracoon has been built on it. To the southward of it, at the entrance of a river (*Rio dos Ramos*, stands a high mountain, called the *Old Man* (*O Velho*). From the Old Man to *Cape Euspa*, the N. point of Little Fish Bay, the bearing and distance are S.W. ¼ S. 12 leagues. Between the Old Man and Cape Euspa are two sandy coves, named *Moscas*, or *Flies Bay*, and *Tartaruga*, or *Turtle Bay*, divided by *Cape Gertruda*, and in either of which anchorage may be found. Of Turtle Bay, in about 14° 54′ S., the shores are fertile, with every appearance of being inhabited. Between this and Cape Euspa is a small bay of similar description, having good anchorage, called *Bahia das Pipas*, because, in 1842, the Portuguese commandant here burnt a large number of casks, intended for slave ships.

BAHIA DE MOSSAMEDES, LITTLE FISH BAY, or ANGRA DO NEGRO, is the most southern station of the Portuguese dominions in Western Africa. The original name was Angra do Negro, afterward called by the English Little Fish Bay. In August, 1715, the Captain General Barao de Mossamedes despatched Colonel Luis C. C. P. Furtado to explore the coast South of Benguella with an expedition, and this bay was one of his discoveries, which, it is stated, were excellently recorded, and exactly observed. The name of the Portuguese governor was intended to be imposed on it, and an establishment founded, but this did not take place till January 20, 1840, when a presidio was formed on its South side.

The colony of Mossamedes is rapidly increasing in size and importance, and there are many establishments in the country owned by Portuguese colonists, who farm the land, which produces abundantly. Cotton, too, is grown of good quality. There is no slave trade here; and if the succeeding governors possess the same intelligence, administrative capacity, and desire to improve, as the present one, Lieutenant-Colonel Fernando da Costa Leal, exhibits on all occasions, Little Fish Bay will become a most important colony of the Portuguese crown.*

It was first colonized by immigrants from Madeira and Brazil. In 1857 a large number of Germans were sent out by the government, and they were established at Huila, in the interior, and their settlement was then called *Vista Alegre*. It stands on the mountains, and is supposed to be healthy. Sugar, cotton, and horses are among the products, rapidly increasing in importance under Col. Leal's care.

The Bay of Mossamedes is bounded on the North by *Cape Euspa* or *Girando*, and to the South by Point Annunciaçao, 6 miles asunder, N.N.E. and S.S.W. The bay penetrates about 6 miles within this line.

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* Commodore A. P. Eardley Wilmot, Oct. 25, 1864, in Parl. Papers, 1865, lvi. 155.

Cape Euspa, in lat. 15° 7′ 30″ S., long. 12° 9′ 20″ E., has nothing remarkable. It is low and dark-coloured. From this the rocky shore runs 3 miles S.E. by S. to *Pta. Redonda*, of moderate height, and very steep-to. At 1 mile North of it is the mouth of the *Rio Quenina*. At 1 mile from Pta. Redonda the depth is 140 fathoms, and close to it 20 fathoms, this depth diminishing suddenly towards the South side of the bay, and, therefore, there is no anchorage on its North side. From Pta. Redonda the coast is a sandy beach, forming the arc of a circle facing the West, and terminating at *Ponta Negra* at the South. At 3 miles from the Pta. Redonda is the mouth of the *Rio Béro*, or *Belo*, just to the South of which are the gardens and a chalybeate spring. At a mile from it, on the sandy beach, stand the houses of the factory.

On the summit of Ponta Negra stands the fort of San Fernando, and near it the quarters of the presidio. To the westward of the point the coast forms a small bay, bounded on the West by a high, rocky cape, called *Pta. Grossa*. It is perpendicular, and indeed overhangs its base. On its summit is a look-out house, painted white. It is in the small bay between Pta. Grossa and Pta. Negra that there is good anchorage.

From Pta. Grossa the rocky shore ceases to the West, and forms another bay, bounded by Pta. de la Annunciaçao, which is low, sandy, and difficult to make out. In this bay is a very dangerous, rocky, and sandy bank, on which is not more than 10 feet water, and in some places not more than 2 feet. It is called the *Amelia Bank*, from a Portuguese war schooner which was lost on it in 1846. Its North end lies with Pta. Grossa bearing E. by S. It may be avoided by keeping Pta. Negra a little open East, or to port of Pta. Grossa, which will lead three-quarters of a mile outside it.

The watering place is at the river, when the boats can lie alongside the bank, and the casks may be filled with a pump and hose. The best time for this is in the morning, before the sea breeze sets in. During the calêma or rollers, the water becomes brackish. The climate of the bay is healthy, except near the watering place, where there is some stagnant water. The village is in the bay near the anchorage. There are a large number of natives established in and around the bay. They appear a fine and intelligent race of blacks, called Mocoroca, of the Mucubal nation. They cultivate maize, and have large herds of bullocks, which, with sheep, may be procured. The trade is in ivory, wax, gum-copal, and orcilla.

Near Point Annunciaçao hills and high cliffs begin along the coast, that extend 6 or 7 leagues S.S.W. as far as the entrance of *Rio dos Flamengos*; and about midway stands *Monte Negro*, which is conspicuous at a considerable distance.* The Rio dos Flamengos, the bed of a torrent, issues from a gorge into an exposed bay, called the *Bay of Cape Negro*. On the North bank of the river, a few miles inland, is the village of Lonchaut. At 6 miles S.W. of Cape Negro is a bold cliff projecting from the interior like an immense wall. It is 134 feet high, and being visible for 20 to 25 miles off, is a good mark for Port Alexander. It is called *Sand Cliff*.

CAPE NEGRO.—The coast now trends more to the S.S.W. or *S.W.* to CAPE NEGRO, a headland distinguished by a pillar of alabaster, with the arms of Portugal, erected by Bartholomew Diaz, in 1846, and which stands in lat. 15° 40′ 42″, long. 11° 58′ 18″, according to the survey of Captain Owen, 1825. It is the southern limits of the Portuguese domination. Near this spot the first trees were seen after leaving the *Cape of Good Hope*. Some bullocks were seen, but no huts or natives.

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* Proceeding southward, from Mossamedes Bay, the rocks upon the coast appear of two or three different kinds, but principally sandstone, in horizontal strata, in which fossils are imbedded: others are of primitive or volcanic substance, of harder and more irregular structure. In the dry season many rivers appear to be completely locked up by sandy beaches, but which may, in the rainy season, be broad and rapid streams. Farther northward the land is composed of red intermixed with tinges of blue clay and yellow sand.

At *Cape Negro*, in November, 1825, on approaching from the *southward*, the climate seemed to have changed, and the desert partially ended. The first tree (a palm) for many hundred miles was the seen, as also a hut and a native: the heavy sea and the boisterous and cold weather that had before prevailed, changed into smooth water, and a mild, pleasant temperature. The cape is formed by a precipitous mass rising at the extremity of a low projecting point, and resembling an island. It is incrusted by horizontal strata of different coloured earths and sand. On its summit was seen the pillar, or the remains of the small marble cross, erected by Diaz. The precipice abounds in fossil shells of various species, the most remarkable being of a spiral form. To the southward of Cape Negro is *Cape Albina*, before mentioned, formed by some remarkable steep white cliffs, which, with the rays of the setting sun upon them, resembled a group of Grecian columns in ruins.

PORT ALEXANDER, at 2½ leagues S.W. ½ S. from Cape Negro, is a snug harbour, with excellent anchorage, in which ships may ride safely. The few natives who have been seen here appeared like miserable outcasts. The peninsula, forming the harbour on the North, is a low sandy tongue of land. The outer limit on the East is the high sandy cliff, and the coast thence northward to Cape Negro is of a similar description. The N.W. part of the harbour is shallow; but in other parts the depths are 18, 17, 16, and 15 fathoms. Variation, in 1867, 25° W.

Sandy Point, the extremity of the peninsula, may be passed close to on the East side, as well as the whole of the continental shore of the port: but the southern shore of the peninsula is guarded by a bank which extends to the West of the port, and shows, from the different colour of the water. Point Alexander is easily made out in coming from the North, from the cliffs, &c., before mentioned; but the approach from seaward to the South will be with some uncertainty, as the Sandy peninsula will be confounded with the main land. The masthead look out, however, will be able to see the port over the sandy neck. Allowance must be made for a slight northerly current. In coming either from North or South, an outer bank, called the *Ringdove* or *Dormer Bank*, must be avoided,* which lies on the meridian of Sandy Point, and 1⅓ mile off from it, on which is only 3 fathoms. To clear it, keep half a mile from the shore of the peninsula, or still better, coming from the North, within that distance of the shore of the main land. It is high water, full and change, in Port Alexander, at 3^h; tides rise 4¾ feet. The only resource to be had in the bay is an abundance of fish. The nearest inhabitants are at a village called *Coos*, 9 miles E.N.E. of the anchorage.

Captain Messum describes the line of coast between Great Fish Bay and Port Alexander as so free from danger as to allow a vessel to approach within half a mile. One small indentation alone is to be found between these places.

From the entrance of Port Alexander the coast runs to the West and S.W., and thence southerly, as already shown, to the entrance of Great Fish Bay.

HOTTENTOTIA, ETC.

The countries between that last described and the Cape Colony are inhabited by different tribes, which it would be beyond our limits to describe. The coasts have been named according to the people who live on it thus:—

Cimbebasia, the country of the Cimbebas, extends from Cape Negro, or Great Fish Bay to Cape Cross: and *Hottentotia*, that of the Hottentots, thence southward to the Orange River.

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* Seen by Mr. Dormer, of the *Ringdove*.

A portion of this coast suddenly sprung into great notoriety in the course of the year 1843, from its being the depository of the manure called *guano*,* we subjoin a few general notices of the coast previous to giving the particular descriptions of it.

At about Cape Negro commences that region of desert and arid sands which extends to beyond Ichaboe, resembling in their aspect from the sea, the Great Sahara of Africa in the northern latitudes. The whole of this coast and country is nearly rainless, but at times heavy dews prevail. The origin of this intense aridity is the long continued action of the vertical sun, which is near the tropics for so long a period of the year, that between the latitude of 20° and the tropic he is vertical 62 days, being less than one-sixth of that time over any similar extent of latitude. Besides the dryness arising from this long continued powerful solar action, the West coast of the continent is far removed from the origin of the rain clouds borne by the trade winds, which being deposited during their transit over the continent to the eastward, before reaching the West coast they have parted with all, or nearly all, their moisture. It is to this fact of the solar intensity and the previous deposition of rain, that the guano deposits are owing; the qualities of which accumulations would be entirely destroyed by the influence of rain. Good guano has only been found in three similarly situated localities, that on the *West* coast of Africa; on the coast of Peru, the *West* coast of South America; and on the *West* coast of Australia, all within the same latitudes, and consequently under the same climatological influences.

The coast northward of the more settled districts of the Cape Colony have become much better known of late years than formerly, when we had only the very cursory and incomplete examination made by the unfortunate expedition under Capt. Owen, as a guide.

The guano trade drew much attention to it, and Captain W. Messum examined it throughout, in search of guano and nitrates. His journal and survey were given to the world in the excellent works by Mr. Charles John Anderson,† quoted below. Besides these we have the very interesting narrative of Mr. Thomas Baines,‡ the well known traveller and admirable artist, who has been alone in delineating the borders of Inner Southern Africa.

The Natives would require too lengthened a description for this work. Their very singular character, habit, and appearance, are amply described in the volumes just quoted, as well as in other works. Generally they are harmless, not having been subject to the vitiating influences of the slave-trade, which here had so marked an influence on the people within the Portuguese limits. But they are of very little service to civilized man, and moreover are very sparsely distributed.

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* The places on the West Coast of Africa, on which guano has been found, are as follows:—From a small rock in Sandwich Harbour, a few tons, of bad quality, were removed. From Hollam's Bird Island, a few hundred tons were procured with difficulty. From Mercury Island, about 1,500 tons. Ichaboe is the next in succession. In Angra Pequena, Penguin and Seal Islands afforded about 3,000 tons of indifferent quality. From a small island southward of Pedestal Point, about 8,000 tons were removed between July and October, 1844. From some small rocks between Possession Island and Pedestal Point a small cargo was taken. Possession Island afforded 4,000 or 5,000 tons of very inferior quality. From the Albatross Rocks, South of Possession Island, a small quantity was removed in 1845. Between Cape Voltas and Possession Island, from a small island, called Plum Pudding Island, about 2,500 tons were taken. From Olifant Rock, at the mouth of the river of that name, 1,500 tons of excellent guano have been removed by Government license. In Donkin's Bay there are some detached portions scarcely worth removing. On some detached rocks, in St. Helena Bay, called the Paternosters, about 3,000 tons were removed. In Saldanha Bay, a deposit of good guano has been removed, under Government superintendence, from Mallagassen Island. About 3,000 tons have been taken from Seal Island, in False Bay; and about the same quantity exists on Dyer Islands, near Cape Agulhas; and on the Bird Islands, in Algoa Bay, about 60,000 tons, very wet, and of indifferent quality, will soon be entirely removed. It is believed, after a minute search, that guano does not exist in any quantity on any other part of the African Coast.

† A Journey to Lake 'Ngami, &c., by Charles John Andersson, London, 1856. Also, The Okavango River, a narrative of travel, &c., 1861.

‡ Explorations in South-West Africa, in 1861—62, by Thomas Baines, London, 1864.

Game is very abundant in most places, and an account of a journey is but a narrative of continued encounters with wild and ferocious animals, or with large herds of the deer and antelope tribe, or of vast flocks of birds.

The *South African Current*, described in the early part of this work, is always running to the *North*, and the general direction of the wind being the same, render it necessary for vessels proceeding to any part of this coast to make the land to the southward of their port, as it is very difficult to work to windward against the current.

Ships running along the coast will often judge themselves farther off-shore than they really are, on account of the light sandy colour of the coast, and the extreme haziness of the atmosphere that generally prevails.

As the rollers frequently set upon the coast from the westward with great fury, and there is almost always a tremendous heavy swell thundering upon the shores, it is advisable to give the shore a good berth, except in making the harbours. This remarkable swell, which incessantly sets in from the W.S.W., renders it very unpleasant for ships in calms, which often prevail in the night.

Heavy squalls and gales of wind are frequent on this coast, and often come on without warning, and with a cloudless sky. Sometimes the sand is blown from the desert in large quantities, filling the air with minute particles, which are a long time subsiding, and accompanied by intense heat. These are sometimes disastrous and fatally destructive.

It has been reported that this Western Coast of Africa is entirely destitute of fresh water, and that none is to be found between the 16th and 31st degrees of South latitude. This is not the case, as fresh water is to be found on many parts of the coast, as indicated in the ensuing description.

At 10¼ miles southward from Albina Point, the old charts place the *Rio Bambaruga*. The South point of the river, called by the Dutch *Point Cunegonde*, is uneven and of a black colour. Captain Messum could find no trace of it, but was inclined to believe, from the vegetation in a ravine, that a watercourse may at times run through the country.

GREAT FISH BAY is formed on the West by a peninsula of sand, 7 leagues in length, and trending S. by W. [*S. by E.*] This is called *Tiger's Peninsula*, and its North point is in 16° 30′ 12″ S., and 11° 46′ E. The greatest breadth of the bay is at its entrance, and is about 2 leagues. The eastern shore of the bay is formed of high, barren hills, of a brown sandy appearance. The depth at the entrance is 20 fathoms, near the middle 12 and 10 fathoms, decreasing thence gradually to 7, 6, 5, and 3 near the shore. Plenty of fish may be got there. The peninsula is all sandy, and the isthmus, by which it is connected to the main land, is not above one-third of a mile broad. There are no dangers in turning up this bay, if you give either shore a distance of 2 cables' lengths; and when once at the head of this spacious harbour, and at anchor in 5 or 4 fathoms water, you may lie in perfect safety, with one anchor ahead, all the year round.

Great Fish Bay is formed by Tiger Peninsula, a long sandy tract of land, in no place ten feet above the level of the sea, and towards its southern extremity so narrow that the sea occasionally washes over it. The North end of the Tiger is somewhat broader, perhaps two miles. The anchorage at the head of the bay is in lat. 16° 50′ S. This will give the bay a length of about 21 miles. In many parts it is rocky: its head, approaching from the South, may be seen several miles off. The water on its eastern side washes the base of the sand-hills, and contains several very fine mussel beds. In the survey made by Captain Owen, the bay is represented as perfectly safe;

yet about 10 miles South from the point is a shoal, on which we struck, and knocked off thirty feet of our false keel.—(*Captain Messum.*)

Great Fish Bay, like all the other bays on this coast, has undergone great changes. Its southern extremity has evidently been blocked up.—(*Andersson.*)

At some distance from the isthmus, or the South point of the peninsula, the land is bordered with downs, to the distance of 18½ leagues, *S. by E.*, *true*, and forms several slender bays. Here, in lat. 17° 15′, is a river called Nourse River, which was discovered by *L'Espiegle*, in 1824.*

The Cunene or Nourse River does not reach the sea except during the rainy season. Its mouth during the dry season is barred by a sand bank, on which the sea breaks furiously, particularly on its South point, called in the old charts *C. Ruy Perez.* The current out of it is very violent, and the tides may be felt 10 miles off during the rainy season; the flood setting E.N.E.; the ebb, W.S.W. It is one of the largest rivers of S.W. Africa.

"This river" (the Nourse), says Captain Messum, "lies in a bight, and appears to flow into the sea through two rocky heads. Off the southern of these is a reef extending several hundred yards to the westward, sheltering, it would seem, a landing place, as the water inside was smooth quite up to the river. The beach to the North is covered with large timber trees." An expedition was sent to explore it, in 1855, by the governor of Massamedes.

Captain P. Heywood, in H.M.S. *Nereus*, 27th January, 1811, made the coast northward of Fish Bay, in lat. 16° 18′, which part appeared to be flat, sandy, and streaked perpendicularly with black and brown streaks. The ship was 8 or 9 miles off-shore, in 12 fathoms, muddy bottom. From this spot, the whole of the coast in sight to the northward had the same brown sandy appearance; and it might be seen at the distance of 7 or 8 leagues, were it not for its light sandy colour, and the hazy atmosphere that generally prevails. S.W. winds and a heavy swell rolling in from that quarter upon the shore render a near approach unsafe.

The *shoal of Antonio Casado de Viana*, said to lie at 70 or 80 leagues from this coast, has already been described.

From the Nourse River the coast runs nearly due North and South, and is safe, with the exception of a small shoal patch, in lat. 17° 50′ S., which extends about half a mile from a low beach studded with rocks.

CAPE FRIO (*Cold Cape*) is in lat. 18° 23′, long. 12° 2′ 20″. The land is high from this cape 5 or 6 leagues to the northward, but the shore is sandy and low, and thus likewise it continues for 15 leagues to the southward from the cape, with a shore generally clean, and a depth of 13 and 14, 17 and 18 fathoms, at a short distance. From Nourse River to Cape Frio the coast trends S. by W. ½ W. and South [*S. ½ E.* and *S.S.E.*], and the distance is 25 leagues. To the North of the cape is *Angria Fria*, or Frio Cove. Here the coast is low, with white sand, and you will have 30 fathoms, oozy ground, at a league from the shore. The land near the cove is very steep, and known by three hills, the middlemost of which is the largest. The coast from Cape Negro to this bay is thinly inhabited.

From Frio Cove, the coast being all fair, with double land, trends S.S.E. [*S.E.*] 6 or 7 leagues. The sea side is full of trees, with sandy hills; you will have 16, 17, and 18 fathoms of water within 2 leagues from the shore. This part of the coast is what the Portuguese call *Praya das Neivas*, or Snowy Beach.

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* 28th Nov., 1825. In Great Fish Bay. Nourse River was not to be found; not a trace of it was visible; neither was there any opening to the land for 30 miles on either side. From this it was inferred that the rainy season commences with the new year, when the waters force this passage, or river, in their course from the interior; and consequently Nourse River may be open at that season; but with the strong perennial winds it is again closed by the sand.—*Captain Owen's Voyage.*

The coast hence trends to the South [*S.S.E.*], and Captain Owen's survey is here imperfect; he exhibits the coast, between the parallels of 19° 40′ and 21°, as having a low sandy shore rising into elevated and mountainous land, with soundings of 20 to 16, 12, and 10 fathoms near the edge of the beach.

The coast has been examined by Captain William Messum, and we extract the following from his descriptions as given in Mr. Andersson's work.

In about lat. 18° 27″ S., a point projects from the uniform land to the southward, between which and Cape Frio it makes a half moon sweep, forming a bay about 5 miles around. Under this point, which he called *False Cape Frio*, temporary anchorage may be had in 5 fathoms of water. sandy bottom, by bringing the point to bear W.S.W. The shore here is low, a high block of rock, a detached mass from the mountain range forming its back ground.

To the southward the space between the beach and the sand-hills is about 2 miles broad, but in lat. 18° 42′ it becomes narrow, and at 8 or 10 miles inland is a range of rocky mountains of moderate elevation.

Fort Rock Point, in about lat. 19° 1′ S., is a remarkable headland, so named by Captain Messum. It is the extremity of a low sandy point, with a large round block of granite close to it, which forms between the cape and the rock a considerable chasm. Round the sandy point is besides a cove, with a bar enclosing smooth water extending across its entrance. There is here every facility for landing with boats. Vessels, too, may anchor in five fathoms, bringing the rock to bear W.S.W., but except in fine weather it would be dangerous to do so. The place is particularly worthy of notice, as well suited for the formation of a trading establishment or a missionary station.

At six miles South of this a river of some magnitude was seen meandering through a low sandy flat. It is in lat. 19° 7′ S. At 12 miles further South, lat. 19° 19′, the shore is fronted by a bar or recif, parallel with the coast, about a cable's length distant. South of this the coast assumes a bold outline, is very little varied by cover or embayments, and is pretty free from danger. Close inshore no bottom with 20 fathoms. In about 20½° S., two remarkable rocky mountains may be seen inland—the *Cock's Comb* to the South, and the *Sugar Loaf* to the North, thus named by Mr. Andersson.

In about lat. 21° the Portuguese charts place a harbour, named *Angra de St. Ambrosia*, but Captain Messum, after fifteen days' search, coul not find it. He conjectured, therefore, that it had been filled up by the encroachment of sand. In about lat. 20° 47′ there is a remarkable break, of about three-quarters of a mile, in the sand-hills, evidently caused by an immense body of water at times rushing through their heavy heaps. Between lats. 20° 39′ S., and 21° S., is a series of bays, reefs, and rocks, the most southern of which is a bay of some depth, beset with many shoals. Beyond this the coast is quite uniform and clear to Cape Cross.

CAPE CROSS, or Cape Sierra.—In lat. 21° 50′, long. 13° 57′, is *Cape Sierra*, or the *Cape Cross* of the recent charts. The shore is here similar to that which has just been described, and that southward of this cape is distinguished by white sandy hills. Cape Cross is in the form of a truncated pyramid of moderate height. It is readily known by its blackish colour. *Cape Cross Bay*, to the North of it, has good anchorage; the *Bay da Sierra*, to the South of it, is entirely open to the N.W. winds and swell. It is, however, used by whalers.

" Cape Cross, a rocky headland, projecting about a mile to the westward of the southern line of sea coast, forms a bay to the northward of from 2¼ to 3½ miles in depth. From the point a reef, about 100 yards long, terminates abruptly in a depth of 10 fathoms water. On rounding the cape (from the South), fair anchorage is immediately found in 6 fathoms, but the best anchorage is to be had, after passing a slight projection from which another reef extends, about 1¼ mile further on. The best landing is abreast of a red sandstone rock."—*Mr. Andersson.*

At 30 miles along the coast, from Cape Cross, is a rocky blackish point of moderate height, surmounted by a sandy down, called *Point Farilhao*. Off it are two volcanic rocks, the *Farilhaos*, which clearly distinguish it. Point Farilhao is in lat. 22° 9′ N. long. 13° 11′ 50″. *Rock Bay*, of which Point Farilhao is the North point, is used by whalers, but we have no particulars of it.

Directly inland from Cape Cross, is the highest and most conspicuous peak of the whole black mountain range, which runs parallel with the coast. It has been named *Mount Messum*, the Damaras in the neighbourhood call it Dourissa. It is 3,200 feet above the level of the plain, the East and West faces are abrupt, but the southern extremity is nearly perpendicular.

From Cape Cross to the *Omarum River*, the shore has a fine bold outline, and is quite free from danger. There are vast quantities of driftwood near the mouth of this river, which must have been forced through the sandy table land. There are some other rivers passed in going to the southward. Inland the rugged hills still continue. The southern extremity of the range being marked by a hill of considerable height, shaped exactly like a dome.

In lat. 22° 32′, a mountain of considerable elevation is seen, *Mount Colquhoun*, 18 miles inland, a remarkable hill 3,000 feet high, with several peaks on the top, which are sharp and inclined toward the N.E.; and near it a large body of water, forming a kind of lake, about 40 feet above the level of the sea; and here were the first symptoms of vegetation met with since leaving the Cape of Good Hope, a few stunted bushes and patches of heather being scattered around.

Swakop River.—At about 15 miles northward of Walvisch Bay, a river was discovered by *L'Espiegle*, in 1824, and named *Somerset River*; this is the *Swakop*, or Bowel River, flowing from the eastward. Near its mouth and extending as far as the eye could reach, are the lofty mountains, mentioned below, called the *Quanwas*, or Clay-trap Mountains (Mount Colquhoun), reaching from 2,500 to 3,000 feet above the sea, and forming a conspicuous land-mark on making the coast.

Lieutenant Ruxton says, "I examined the Swakop, or Somerset River, which is 40 miles to the North of the Kuisip, which runs into Walwich Bay. The Swakop was not visited by Sir J. Alexander, although it was by far the best route he could have followed on his return.

"When it flows, it must be a considerable river, the mouth being 500 yards wide; and it must *once* have flowed with great force, having worn its way through rocks of granite. Its mouth is blocked by a bar of sandy beach, and covered with reeds and flags. A species of hemlock grows in its bed, which, to 20 miles from its mouth, is dry. Water is, however, easily procured a few inches from the surface. Passing the first 20 miles, there are large pools and abundant pasture for many thousand head of cattle, which increase the further you proceed to the eastward.

"It is by the route of the Swakop that the natives proceed to and from the interior, it being perfectly practicable for oxen and waggons. It runs nearly due East. From its source (which, according to the natives, is in a mountainous country) to its mouth, a distance of 300 miles, it passes through a succession of fertile plains, lofty hills, and sandy deserts. Seventy miles from the sea coast the desert changes into plains of fine pasture, which increase in fertility the further you advance, until, at the village where Africana resides, the country is rich and fertile, covered with flowers and a luxuriant vegetation. In its course to the sea, it has worn its way through lofty granite rocks, which on its North bank stretch away in a perfect level for many miles.

"Although dry to appearance, the water, most certainly here, as in other rivers on the coast, steals silently along under the sand, and is everywhere procurable at a trifling depth below the surface. The alluvial soil is a black loam, in which are seams of nitrate of potash, in thin leaves, and which also is found in many places as a superficial deposit. At the mouth rocks extend far out to sea, rendering it impossible that any boat could enter the river, even if there was sufficient water. Neither can a vessel lie with safety nearer than 10 miles from it."

On proceeding southward to Walvisch Bay, the soundings on the coast were found to be dark and muddy sand, the action of which upon metals turns them black, and the effect upon the leads and chain cables makes them appear as if painted.

WALVISCH BAY.—At 23 leagues S. ¾ E. from Cape Sierra (or Cape Cross) is the entrance of a convenient harbour, forming the South part of *Walvisch* or *Walwich Bay*. This harbour was surveyed by the officers of H.M.S. *Leven*, under Captain Owen, in 1825. Its western side is a sandy peninsula, 4 miles in length, terminating to the North in *Pelican Point*, where the breadth of the entrance is 3¾ miles. All the shore is of sand, and the soundings regular, from 7 to 5, 4, and 3 fathoms. Pelican Point is in lat. 22° 52′ 30″, long. 14° 27′. The interior presents a range of desert sandy mountains.

Walvisch Bay has been chiefly described by travellers as a starting point from the interior. Its dreary sands, its total deficiency of water, and the absence of all dwellings, render it a very undesirable place to remain at. Situated nearly on the tropic, it is in the zone of the most arid desert, consequently there is not the slightest vegetation—all is barren, heated sand, and the effects of the mirage are most extraordinary.

Among the authors whose works are most useful is Mr. Andersson, who started from this to Lake 'Ngami, and also describes it in his second work, "The Okavango River," before quoted.

Mr. Andersson has been for many years a settler in Damara Land, in the interior; but, sad to say, has suffered much from the barbarous natives.*

Another well known traveller who writes on it, and has most graphically delineated it, is Mr. Thomas Baines, in his pleasant work.

Water is brought to the coast from the interior in a large cask, on axles, drawn by a horse, after the manner of a garden roller. There is occasionally a rude dwelling house, but nothing of any permanence. The ivory trade of the interior lake districts was almost exclusively brought to this, and an important fishery was also established.

A particular plan of the bay was made in 1786, which represented it as 8 miles broad and 4 deep, taking the depth from two little mussel islets on the coast, which are, perhaps, the *Farilhoens* of the Portuguese charts. Within the peninsula, on the western side, the water is shoal. The coast at the bottom of the bay is low and marshy. High water, on full and change days, at 1^h 50^m.

In the month of November, 1825, during hazy weather, every object in the vicinity of Walvisch Bay appeared much distorted by refraction from the dry shining sand, constituting the back ground. Some ribs of whales which had become fixed in this sand, with one end standing upright, appeared like the masts of ships of considerable burden; while common gulls resembled large sheep, when seen from the distance of a mile. *Pelican Point*, the N.W. extremity of the bay, was thickly covered by the wrecks of whales, with all kinds of fish, and sea fowl, in every stage of decay, from which it is evident that strong westerly gales sometimes drive the sea over this natural breakwater. Captain Alexander saw, on the beach, the boxes of several sailors who had been murdered by the natives.

Between Walvisch Bay and Elizabeth Bay, in lat. 26° 55′, many great trees were seen lying high up the beach; and it is a remarkable fact that, as not the slightest vegetation exists on any part of this coast, much less trees of any magnitude, these must have been brought by the strong perennial S.W. wind and current from regions unknown. (Probably from the Indian Ocean.)

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* In March, 1864, this accomplished and intrepid traveller and settler was attacked by a large body of Hottentots, and after a regular pitched battle, in which 4,000 men were engaged, his side was victorious, but he was dreadfully wounded, lamed for life, and had lost all his property.

*Captain Morrell,** in his third voyage, thus describes Walvisch Bay:—"The entrance to the bay is 1 league, running to the South 2 leagues; 1½ leagues of which is navigable; and the depth of water in going in is from 12 fathoms to 3, mud and clay bottom, near the head of the bay.

"The East side of this bay is formed by moderately elevated sand hills near the sea shore, and the West side is formed by a very low sandy peninsula, not more than 15 feet above the level of the sea at any place. The isthmus is very narrow, it being not more than 20 rods from the head of the bay to the sea shore. The peninsula, however, is from 1 to 3 miles in width. In entering the bay it is necessary to give the West point a good berth of nearly half a mile, on account of a sand bank that runs from it, in a N.N.E. direction, about a quarter of a mile, on which there is only 6 feet of water at low tide. After doubling this point, in advancing up the bay, it is proper to give the western shore a berth of one-fourth of a mile; taking care not to approach it any nearer, as the water becomes shallow very suddenly, to from 5 fathoms to 2, and even to 4 feet, at low water. This is a mud bank, which stretches all along the western and southern shore of this bay; but the eastern shore is bold, 1 cable's length from the beach, nearly to the head of the bay. The water is entirely smooth all over the bay, and consequently it is a safe as well as a spacious harbour at any season of the year.

"The interior of the country to the eastward of the bay presents a dreary range of desert sandy mountains and valleys, entirely destitute of soil, or vegetation of any kind, for 20 or 25 miles inland, with the exception of a few valleys that lie to the E.S.E. and S.E. of the head of the bay, in which are a few Hottentot villages, with small herds of cattle and sheep, that feed on such coarse grass and shrubs as they can pick up.

"About 3 miles from the S.E. part of the bay, on a S.E. by E. course, is a small village, where fresh water may be had from many springs in the valley. This water possesses a peculiar flavour, not unlike sassafras tea, and it is not in the least brackish. The village contains about 250 inhabitants, who often visit the bay for the purpose of fishing. I have frequently had them on board the vessel, and have purchased from them cattle and sheep, which were in fine order. I uniformly found them to be a very friendly, harmless, inoffensive people; but very indolent and filthy, and somewhat given to thieving.

"This bay and its vicinity, in the months of August and September, are visited by great numbers of right whales (hence its name) which resort here for the purpose of bringing forth their young. Fish also, of various kinds, and in great abundance, may be caught here with a seine: but it is difficult to haul the seine on shore in any part of the bay, excepting the eastern shore, on account of the mud flats. Ships visiting this bay for the purpose of taking whales, in the months before named, should anchor about half a mile within the bay, under the western shore, in 5 fathoms of water, muddy bottom. In this situation they will be enabled to see whales from the masthead outside the peninsula, and at the same time lie in safety, as northerly winds never blow here more than a royal breeze, and that for a few hours only. The wind blows nearly all the time from the South; and often, in the afternoon, a single reef breeze. But it is generally calm at night, and in the fore part of the day."†

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[*] Among the best known works on this region is Captain Benjamin Morrell's "Narrative of Four Voyages," published at New York in 1832. This book has the very great merit of having made known to Europe the existence of bird manure, or guano, on Ichaboe. This fact has been of incalculable importance to mankind, in the great increase it has given to agricultural products. But it has also the demerit of being a fiction. It is a very clever compilation; and although the author unquestionably must have visited many of the places he so circumstantially describes, yet, as a *narrative*, it must be placed on the same footing as Robinson Crusoe, and other tales, drawn from the imagination.

[†] In the ensuing chapter of Captain Morrell's book he gives an account of a journey he

Captain (afterwards Sir) J. E. Alexander reached this place overland from the Cape of Good Hope, in April, 1837. He says:—Walvisch Bay extends along-shore, as it were, for 20 miles. A long spit of sand, terminating in Pelican Point, forms its S.W. shore, and offers an effectual barrier to the roll of the South Atlantic. Vast flocks of pelicans, flamingoes, geese, gulls, &c., frequent this sheltered bay. To the East of the bay there are long ridges of sand, covered here and there with dark bushes; behind these ridges, and in the valleys, brackish water is everywhere to be found, by digging. Between the ridges and the sea, where they halted at a pool, there was a plain covered with reeds and grass; whilst the heavy roar of the breakers broke on the ear continually from the West. Morning and evening the atmosphere was obscured by a grey fog, confining the view of the landscape, which, in consequence of the mist and the dimly seen sand-hills, had a peculiarly wild and dreary appearance.*

SANDWICH HARBOUR, or Porto d'Ilheo, lies about 13 leagues to the southward of Walvisch Bay, in lat. 23° 30′. The *Ponta dos Ilheos* is said to be encompassed by reefs, stretching out to sea; and within this point is the harbour, which is small, and has only 3 fathoms of water.

Sandwich Harbour—the Porto d'Ilheo of the Portuguese, in lat. 23° S., or about 13 leagues from Walwich Bay—though honoured with so high-sounding a name, might perhaps, with more propriety, be called a lagoon, 2 leagues or thereabouts in length, with a depth of water varying from 7 to 2 fathoms. It is formed on the East side by a high, white, bluff sandhill; and on the West by a low sandy peninsula, nearly level with the sea, with shoal water for more than a mile on the sea-board. The entrance of the lagoon, formed by two low sandy points, is very narrow, and not more than a quarter of a mile wide.

On the beach at Sandwich Harbour there is a copious fresh spring, yielding most excellent water. Pasturage for cattle may also be had in the neighbourhood. Yet despite these advantages, it is deprived of the importance it would otherwise have by the immense hillocks of soft yielding sand which cut off its communication with the interior.

Sandwich Harbour abounds so much in fish, that some years ago a Cape merchant established a fishery here, which was and is conducted with considerable success. The fish taken, being salted and dried, are exported to the Mauritius, where they always command a ready sale, not unfrequently fetching the high price of 30*l.* to 35*l.*, nay, they have even realised 38*l.* per ton, that is, for one kind of fish called "snook." Other kinds scarcely fetch more than one-half of this high price.—*Mr. Andersson.*

Capt. Morrell says:—On Tuesday, the 18th of November, 1828, we arrived at the mouth of what is called Sandwich Harbour, said to have 3 fathoms of water in its channel of entrance. Although we found only 11 feet at high water in this channel, I have no doubt that there was a time, some years back, when its depth was full 3 fathoms, and that it has been filled up by drifts of sand, the movements of which

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took into the interior, nearly 150 miles E.S.E. from Walvisch Bay. In this expedition he describes having seen immense numbers of cattle, "sleek and well favoured," besides three times the number of sheep. He also found copper, lead, and iron ores, and some indications of gold and silver. The natives treated him with kindness and hospitality. Upon his return to America, his views for speculation in these parts were treated with indifference, though it would appear now with great injustice. His journey in November and December, 1828, would have taken him to a portion of country traversed by Captain Alexander, in the expedition above metioned, the account of which, in a great measure, agrees with that given by Captain Morrell, although Captain Alexander met with great privations, and at one time nearly perished. The latter was in this vicinity in March and April, 1837.

* Geographical Journal, Vol. viii., 1838, p. 14; "Alexander's Expedition of Discovery," Vol. ii., p. 78; and "Explorations in Tropical South Africa," by Francis Galton, pp. 14—21.

along this coast, forcibly reminded me of the snow drifts of my native country; every fresh southerly wind forming new sand-hills, exactly as new snow-banks are formed at home by a fine, clear, cold North-wester.

HOLLAM'S BIRD ISLET.—Nearly on the parallel of this reef, at 9 miles from shore, is *Bird Islet*, or *Hollam's Bird Isle*, in lat. 24° 37′ 24″, long. 14° 32′ 20″. *

This little island is not more than a quarter of a mile in circumference. A reef of rocks runs off from it, in a S.W. direction, about 5 miles, on which the sea breaks at times very heavily. A vast number of right whales frequent this reef in the months of July and August; and a ship may lie at anchor on the North side of the island, in 10 fathoms water, all the whaling season, in perfect safety, if she has chain cables. This island is resorted to by seals, gannets, and penguins; and Captain Morrell said that he took here the skins of 1,400 fur seals at one time, although the landing was very bad. The passage between the island and the continent is about 9 miles in width, free from hidden dangers, with a depth of water from 20 to 10 fathoms near the main land.

Hottentot Bay is 26 miles from Spencer's Bay. It is about 3 miles wide, and about the same in depth. Its S.W. point is low, and is prolonged by a reef for nearly a mile, on which the sea usually breaks. The bay affords good anchorage, and is well sheltered from the S.W. swell. It has a moderate depth of water, gradually shallowing towards the shores; the bottom is a mixture of clay and sand, and forms in consequence most excellent holding ground. In the summer time a vessel may be hove down here with ease. There is abundance of fish, but no fresh water. Whales and seals frequent the bay, or did so formerly. It has been called *Sims' Bay*, and may be *Rae's Bay*. (See Ichaboe.)

It is probable that Bird Islet is the effect of some mighty convulsion of nature which has piled together, in an irregular form, loose blocks of stone, basalt, lava, and other volcanic productions. The waters around its shores, however, abound with many kinds of excellent scale fish, which may be caught with hook and line in great quantities. A few turtle, also, may be found on a small sandy beach on the East side of the island.

SPENCER'S BAY, in from 25° 40′ to 25° 45′, may be known by Mercury Island, which lies off the middle of it.

Mercury Island is a bleak, rugged rock, of an oblong shape, about 1 mile in circumference, bearing N. and S., and rising about 200 feet above the level of the sea, which at times beats against its sides with indescribable fury. In the face of this rock there is an immense cavern, into which the sea rushes through several apertures, or rents, causing thereby an awful noise and commotion.

This rock is the favourite resort of the penguin, the gannet, and other birds; seals also haunt it in abundance.

Considerable quantities of guano have been brought away from Mercury Island, and merchants at the cape long continued to draw from it small supplies, though the manure is said to be of a very indifferent quality. It is impossible to conceive anything more wild and dreary than this isolated spot, and nothing but the hope of great profits could, I imagine, ever induce men to imprison themselves in so wretched a dungeon; a sentence of transportation could not certainly be more severe and more penal than the banishment and confinement the guano gatherers impose upon themselves.

Mercury Island is three-quarters of a mile North from the S.W. point of Spencer's

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* Alligator Rocks?—According to the observations made by Captain Wood, of His Majesty's ship *Garland*, in 1798, in lat. 24° 38′, a reef, called by him the *Alligator Rocks*, lies 6 leagues from the shore, with breakers to the S.W., 2 leagues at least. This must have been Hollam's Bird Islet.

Bay, and 1¼ mile West from the N.E. point. Both passages are easy and free from dangers; and the best anchorage is on the East side of the island, about 150 fathoms from its shores, in 5 fathoms of water, sand and clay bottom. It is not advisable for ships to anchor to the South side of the bay, as a heavy westerly swell heaves into it on the full and change of the moon; but let them anchor close under the island, and they will be perfectly safe, in smooth water.

The South point of Spencer's Bay presents several high peaked rocks, nearly 600 feet perpendicular at the water's edge. Whales frequent this bay in considerable numbers, in the months of July and August. Seals of the fur kind also frequent the shores of Mercury Island; while its summit is thickly inhabited by penguins and gannets during their laying and incubation seasons. The shores and surface of the island present many specimens of volcanic productions, as do also those of the continent in this vicinity, extending some distance into the country.

Captain Morrell says, "I can also refute another erroneous statement respecting this coast. It is said that there is a dangerous shoal lying between 3 and 4 leagues to the West of Angra Pequena, in lat. 26° 35′ S.* But I can assert, with the greatest degree of confidence, that there is but one shoal on any part of this coast, South of Spencer's Bay, that lies more than 4 miles from the main land; and this one lies N.N.W. from Angra Pequena, or Santa Cruz, about 15 miles."

ICHABOE ISLAND is in lat. 26° 18′ S., long. 15° 0′ E.† This island was the scene of a very remarkable commerce in the years 1843 and 1844. It was originally an immense deposit of guano, a production of the sea birds and seals. During the years stated it was the busiest place in the world; crowds of vessels coming hither to carry away this valuable deposit, which at last entirely disappeared about February, 1845. On p. 625 we have given a few remarks as to the physical conditions under which this mass of fertilizing matter had accumulated. As the first notice of it seems to be that given by Capt Morrell, and from whose description the trade arose, we subjoin his description of it.

"October 6, 1828.—From the anchorage between Possession Island and Angra Pequena, we steered once more to the North, and arrived at *Ichaboe Island* on Monday, October 6. This island, which is about 1 mile in circumference, lies 8 leagues to the North and West of Angra Pequena, and not more than 1¼ mile from the shore. On the East side of this island ships may anchor in perfect safety, in 5 fathoms of water, sand and clay bottom, about 2 cables' lengths from its shore. The safety and convenience of this anchorage are owing to the following circumstances:—A point of land from the continent extends 3 or 4 miles into the sea, to the South of the island; and from the extremity of this point a reef puts off in a N.W. direction, until it nearly meets a reef that projects from the West side of the island. Another reef puts off from the N.E. point of the island; consequently a bay is formed, in which a ship might lie all the year round in perfect safety and smooth water. But in coming to this anchorage, care should always be taken to pass round the North (?) end of the island, giving its N.E. point a berth of half a mile, which will avoid all dangers. In working into the harbour, the shore on the main may be approached within 2 cables' lengths.

"This is a fine place for making captive the great leviathan of the ocean, the right whale, great numbers of which strike on this part of the coast about the middle of June. They are in the habit of playing about the reefs of the island, and that which runs from the continental point before mentioned; and as the South wind generally prevails, there is no difficulty in getting the dead whale alongside the ship. Scale fish may be caught at the anchorage with hook and line, or at the bottom of the bay with a seine, in great quantities; an abundance of cray fish may also be caught with a hoop net, all around the island, within 50 fathoms of the shore.

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* According to Captain the late Sir James Athol Wood, R.N., a dangerous shoal lies 11 miles off from the shore of Angra Pequena, in about 26° 35′ South.

† At the period of the guano excitement a plan was received of an island, &c., called *Gallovidia Island*, by Captain Rae, who commanded the vessel of that name. It was subsequently discovered that the place was a suppressed account of Ichaboe itself, with erroneous latitudes and longitudes. Now, however, we incline to the supposition, that the bay was intended for Hottentot Bay to the northward, and the island confused with the account of that bay.

"Eggs also may be obtained here in great quantities. In the months of October and November this island is literally covered with jackass penguins and gannets, which convene here for the purpose of laying and incubation. The nests of the gannets are formed like those of the albatross, but are not so much elevated; while the jackass penguins lay their eggs in holes in the ground, from 12 to 30 inches in depth, which they guard with the strictest vigilance. I have seen them stand at the entrance of these holes and protect their eggs, or young ones, with the most resolute perseverance, until they were removed by superior physical strength. They frequently lay 3 or 4 eggs, but the gannet seldom lays more than two.

"This island is formed of volcanic materials (granite, slate-stone, and quartz), and its shores are resorted to by multitudes of fur seals; we took about 1,000 of their skins in a few days. *The surface of this is covered with birds' manure to the depth of* 25 feet. The S.E. part of the bay, on the main land, directly opposite the island, is the finest place on this part of the coast for jerking beef, it being only 4 miles from a Hottentot village and the springs of fresh water before mentioned, which will supply any number of cattle. Here also I travelled into the interior to a considerable distance, and found that, the further I advanced to the N.E., the more numerous were the herds of cattle and flocks of sheep; while the skins of leopards, grey foxes, &c., could be obtained with the utmost facility, together with ostrich feathers, ivory, and other valuable products of the country."

This description, in many points, is correct; but our increased knowledge of the island has supplied better directions, and it has been surveyed by Capt. M. B. Wade. Though the interest in it has passed away, we here preserve them as being a memorial of a remarkable incident in maritime commerce.

The best anchorage is on the eastern side of the island, with it bearing W.S.W. and N.W., from one-fourth of a mile to 1¾ mile distant. At 2 miles E. by N. from the North point of the island is a rocky spot of only 4 feet water; it is 1 mile off shore. Three miles S.S.E. from the island is a small bay in the main land, where there is difficult landing on a sandy beach; from this there is a pathway to a village of about fifty inhabitants, 8 miles distant, over a bad road through the desert. This is the nearest place where water can be procured, and here it is brackish and scarce. On the coast, 3 miles E. by N. from the island, is a range of black cliffs about 300 ft. high. The strata of rock on shore dip to the northward, so probably anchors will hold best with South winds.

Throughout the whole neighbourhood the stream almost constantly runs to the *northward*, about 1 mile per hour. At the anchorage nearest to the island, the first half of the ebb runs faintly to the southward; this probably is an eddy. The prevailing wind is from the South (S.W. by S. compass); consequently the best passage to the anchorage is through the *South channel* (not North, as recommended by Capt. Morrell), having the advantage of wind, current, and clearer ground.

During November, December, and January, the thermometer generally ranged from 55° to 65° at 1^h p.m., occasionally at 50° or 70° on board the ship in the shade. Water generally 50° to 52°, sometimes 65°. Barometer ranged during the above months, 30·10 to 30·25.

The rollers are similar to those at St. Helena, &c., as described on a former page. When they are heavy, they break above a mile from the island, but usually about half a mile from it.

Boat landing is sometimes difficult and even dangerous, particularly after heavy gales outside, and about the times of new and full moon. On such occasions a surf recoils from the island, and breaks from 10 to 12 fathoms from its eastern shore; but outside of that break, and where a vessel must lie, the water is quite smooth.

At Ichaboe Island it is high water, at full and change of the moon, at 2h 15m. Rise on springs, 7; neaps, 3 to 4 feet.

The breeze is frequently strong from the S.W.; no rain, but dense fogs and heavy dews, occasionally thunder and lightning. The dryness of the air is so great as to produce disagreeable effects on the face, mouth, and eyes.

Ships bound for Ichaboe should make the high land of Angra Pequena and taking advantage of the wind and current, sail along shore, keeping a moderate distance from the land, perhaps about 3 or 4 miles.

It is to Captain Andrew Livingston, of Liverpool, a gentleman to whom nautical science is largely indebted, as will be noticed in many of the preceding pages, that the credit is due for having made known to some Liverpool merchants the fact of the existence of guano * upon Ichaboe, which knowledge he had acquired from Captain Morrell's Narrative. At his recommendation the *Gallovidia* schooner was sent out; but from some untoward circumstances she returned without a cargo, after examining the island. The first cargo was procured by the late Captain Farr, in the *Ann*, of Bristol, who arrived at Ichaboe in March, or April, 1843, upon Mr. Livingston's representation. Captain Livingston, unhappily, has not benefited by the information which has conferred such great wealth and service to the mercantile interest. Many more vessels reached there in November, 1843, but were unprovided with materials for the stages, &c., necessary for embarking the cargo; this difficulty was soon remedied. The arrivals kept rapidly increasing, so that it was found necessary to form a committee to adjust the differences arising among the various vessels. This was in March, 1844. Previous to this, in December, 1843, Captain M. B. Wade was chosen commodore and arbiter. In May, 1844, forty-five vessels were present, and H.M.S. *Thunderbolt* arrived at the island. H.M.S. *Clio* afterwards arrived, and during the conclusion of the occupation, H.M.S. *Isis*, Captain Sir John Marshall, remained present. In August, 1844, 300 vessels were present; in September, about 200; and at the commencement of October there were present at Ichaboe about 6,000 seamen and labourers. The guano, which, in September, had only been removed to the extent of 90,000 tons, was now fast disappearing; and from September, 1844, to the middle of February, 1845, so great was the number of vessels loading, and such the activity of their crews, that the remaining 110,000 tons were entirely removed. Vessels continued to arrive, and in the month of January 450 vessels were present.

The Island of Ichaboe, when first visited in November, 1843, was literally covered with guano; that article being highest at the North end, and gradually declining towards the South end. The guano in the northern pits, soon after they were commenced, measured about 40 feet in depth, decreasing gradually to about 10 feet at the South end of the island. From data which cannot be very incorrect, the whole quantity of guano removed from the island was about 200,000 tons. It was of very different quality, the best being in the northern pits. The N.W. corner contained a considerable quantity, the produce of the gannet and cormorant; the southern end partook very much of the nature of Possession Island guano, and apparently from the same cause, viz., decayed seals as well as their droppings. The vast body, however, of the guano was undoubtedly the produce of the penguin; about one-half of it, it is believed, being the droppings of that bird, and the other their decayed bodies. The primitive granite rock, which everywhere forms the surface on which the guano was deposited, rises highest on the S.E. side of the island, being lowest at the North end. The North end, from the prevailing southerly winds, is the lee end, which, by the birds resorting there for shelter, may account for the greatest height of the guano at that end. The highest part of the rocky surface of Ichaboe is about 40 feet above the level of high water.

Lieutenant Ruxton, who visited Ichaboe in March, 1845, states that notwithstanding a two-years' occupation, and the countless penguins, cormorants, &c., which had been destroyed, these birds were again flocking to the place, and depositing their eggs afresh. So that, at some future age, Ichaboe may again be the resort of ships for procuring guano.

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* The first cargoes of guano sent to England came in 1839-40 from Peru. The credit of this introduction is due to M. Baopoillat and to Mr. Bland, of Valparaiso.

ANGRA PEQUENA * (*Small Bay*), a break of the land, forming several little harbours, is 17 leagues to the southward (*S. by E.*) of Spencer's Bay. Its outer point on the S.W. (*Pedestal Point*) is distinguished by the pedestal of a marble cross, erected by Barth. Diaz, in 1486, and still conspicuous from the offing. Of Pedestal Point the lat. is 26° 38′ 24″, long. 15° 7′ 25″ E.

At a league to the eastward of Pedestal Point is *Angra Point*, off which is a cluster of rocks, extending half a mile N.N.E., from the point, with a channel of 4½ fathoms between them and the point; but it is safest to go round to the northward of them, giving them a berth of half a mile. The coast between them forms a cove, called *Shearwater Bay*, open to the North and N.W.; but in the middle of which there is anchorage in 6 and 7 fathoms, bottom of fine sand, and sheltered from the S.E., South, and S.W. winds.

Within Angra Point, on the East, is an inlet extending 5 miles to the southward, and the entrance of which is half a league broad between Angra Point and Shark Isle. In this inlet, off Shark Isle, is good anchorage in 4 and 3½ fathoms, or a mile higher in 2½ fathoms, bottom of sand. At the head of the inlet is good landing.

The N.E. point of Angra Pequena is 6¾ miles E.N.E. (*N.E.*) from Pedestal Point. From this point three islands extend in a true South direction; the southernmost of which, *Shark Island*, is 5 miles from the point, and forms the N.E. side of the inlet above mentioned. There is no channel to the southward of it to the harbour on the East side. From its North point extends a reef for one-third of a mile; and from the South point of *Penguin Island* there is a similar reef projecting; the channel between them has a depth of 6 fathoms in the middle, and is nearly half a mile wide. One-fourth of a mile East from the North Point of Penguin Island is the *Tiger Rock*, which renders the anchorage in this part unsafe, as the rocks around do not always show themselves.

Between the main land and Penguin and Shark Island is *Robert Harbour*, a good and sheltered anchorage, in 5 fathoms, clay bottom. It may be entered and left with perfect safety, either from the North or South end of Penguin Island, but the southern passage is to be recommended. The best situation to anchor in on the East side of the North Island is near its centre, about 2 cables' lengths from its shore, leaving a single rock, that lies level with the surface of the water and nearly in mid-channel, about half a mile to the North of this passage.

Seal Island lies about a mile North of Penguin Island, and like the outer two is about a mile in length. The bay within, or to the eastward of, this island is about 1¼ mile broad; while that to the southward, or Robert Harbour, is about a mile.

The aspect of Angra Pequena is as dreary and melancholy as it is possible to conceive. Scarcely a vestige of vegetation is to be found within some miles of the place; dry sand and rocks, time-worn and buffeted by centuries of bad weather, constitute the whole landscape. Moreover, there is no fresh water to be had here. To remedy this deficiency an attempt was made, some time ago, to sink a well in one of the granite rocks; but the task proved a failure. Yet, despite these disadvantages, Angra has long been resorted to by traders, who have a depot here, which is occasionally visited by the natives of the interior, who bring with them for sale cattle, fur skins, ostrich feathers, &c. For these goods they receive in exchange clothing, tobacco, guns, ammunition, &c., but more especially spirits, to which the Namaquas, who have once tasted the fiery liquid, are fearfully addicted; they will sacrifice their last ox or sheep to procure intoxicating drinks. Indeed, this portion of the country, which never could boast of much wealth, has been nearly ruined by brandy.

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* Lieutenant Ruxton, on an overland journey he made in 1845 from Ichaboe to Angra Pequena, found on the beach between these places the trunk of a red cedar lying on the beach. The origin of this drift timber affords room for speculation, as there is not a tree growing within 300 or 400 miles North or South of the spot. It may have been brought down by the Orange River and then drifted northward, or perhaps more probably brought by the Southern Connecting Current from the coast of South America.—See *Naut. Mag.*, January, 1846, p. 6.

The sailors of the different whaling, sealing, and guano ships that have touched at Angra for fresh provisions, have frequently, it is affirmed, taken advantage of this failing of the natives to cheat them of their property in the most scandalous manner.

Nov. 21, 1825.—A heavy S.E. gale set in, before which the sloop *Barracouta* was carried with great velocity. In the afternoon the remains of the cross erected by Diaz, on the southern extremity of Angra Pequena, was seen. It had been wilfully cast down within the last 40 years. The gale continued when the *Barracouta* left Angra Pequena, and by the next morning she had run to the northward upwards of 130 miles; having in that distance passed the limit of the rocky and sterile country, and come abreast of the desert. This rises into lofty hills of light-coloured sands, having here and there a small rocky patch, with a few tufts of parched grass, breaking on the dull monotonous view. In some parts of this desert the sand-hills rise to a great height, without a spot of verdure to relieve the eye.

Angra Pequena was surveyed in the boats. The surrounding country is one continued sand, without a shrub so far as the eye can see. The interior bears the same aspect, and no natives were seen.

At Angra Pequena in the forenoon there are light northerly winds; in the afternoon, fresh S.W. sea breezes. It is high water, on full and change of the moon, at 2^h 30^m. Springs rise 8 feet.

Bross or *Sirène Island*, a black rock, lies 1 mile South of Pedestal Point, and will serve as a good mark for Angra Pequena. It faces the N.W., and on one of its peaks, called the Grand Vigia by the whalers, is a white mark called the Cross (M. le Troude). Between the point and the island is a small sandy bay without any shelter, called *Shiermont's Bay*. *Mermaid* or *Merman Island* is 3 miles South of Bross Island, connected to a rocky point to the South by breakers. It is a volcanic mass, protecting a small bay, *Mermaid Bay*, open to N.N.W., but sheltered to the South and East by the main land. It affords middling good shelter. A sandy beach succeeds to the southward for 5 miles, at the end of which is a black islet, *Ilheo Secco*, or *Brisant's Island* (Breaker's Island), close to the North point of a rocky bay, named after the islet; it has no shelter. At 3 miles further on, the coast still rocky, is the projecting point of the North side of Elizabeth Bay, called *Ludovic Point*. *Ludovic Island*, of volcanic formation, is half a mile from the North side of Elizabeth Bay. To the S.E. of it are three islets or rocks, close together, which serve to protect the anchorage within. A fourth islet, in front of the preceding and close to the shore, is prolonged to the S.W. by a reef a mile in length, which joins to the reefs of Ludovic Island. To reach the anchorage, pass to the North of Ludovic Island. A little to the North of the island is a remarkable sugarloaf mountain, called *Monte Deserto*, which serves as a good landmark for Elizabeth Bay.—*Capt. Saisset.*

ELIZABETH BAY.—At 5 leagues to the southward of Angra Pequena is Elizabeth Bay, a very slender bay on the coast, sheltered by Possession Island, which lies to the West of it. There are two anchorages in this bay, that to the N.E. of Ludovic Island above described, between it and the coast, and the other to the East of Possession Island. The isle is 3¼ miles in length, and has several rocks, above and under water, at its North end, with sunken rocks at its South end. The space between it and the shore is from 2 to 3 miles in breadth, and has in mid-channel from 11 to 7 fathoms. Within the middle of the island a vessel may anchor in from 6 to 4 fathoms, but is exposed both to northerly and southerly winds. On the East side is a landing-place for boats. Here the tide, on the full and change, rises about 6 ft. The position of the South point of Possession Island, as given, by Capt. Owen, is lat. 26° 56′ 30″, long. 15° 12′ 30″.

Possession Island is 3 miles in length, and near a mile in width, forming on the East side a concave curvature, in which ships will find good anchorage in from 7 to 4 fathoms, sandy bottom and smooth water. The landing is also good in front of the anchorage, near the centre of the island, half a mile from the beach. At this place, in the months of August, September, and October any quantity of penguins' eggs may be collected, and fish of an excellent quality may be caught in great abundance about the shores.*

There are a few sunken rocks lying off the South point of the island about three-quarters of a mile, on which the sea generally breaks. There is also a reef running off the N.E. end of the island about 3 miles, on which the breakers are frequently very heavy. These reefs both incline to the eastward, which promotes the smoothness of the water in the harbour. Between the island and the continent, or rather between the extreme points of the reefs and the main land, the channel is 3 miles wide, with from 15 to 10 fathoms water, sandy bottom, and free from danger. Ships intending to anchor at this island while the South winds are fresh, should approach the anchorage from the South, and leave it on the opposite passage.—*Captain Morrell.*

It is said that there are some sunken rocks inside of Possession Island, not shown on the Admiralty Chart, on which an anchor is laid down almost on the very spot where there is a rock with only 7 feet water over it.†

Point Bol is the southern limit of Elizabeth Bay. It is rocky, and close off it is an islet of the same name. Boyd's Island, a volcanic formation of a quarter of a mile in circuit, is one-third of a mile S.W. of Bol Island, to which it is joined by reefs. *Plum Pudding Island* is 3⅜ miles from Boyd's Island, the coast between them being bestrewed with rocks, which are visible from the offing. Plum Pudding Island is in the form of a round cap, red at the top. Boyd's and Plum Pudding Islands are called *Albatross Rocks* by Capt. Owen.‡

From ELIZABETH BAY to CAPE VOLTAS, or *Winding Cape*, the coast trends South and S.S.E. 44 leagues. The *Angras Jantas*, or Namaquas Bays, lie about halfway between. Between Elizabeth Bay and Angras Juntas the coast has been found rocky. and without the least sign of water or vegetation. The only animals seen were wolves, although the tracks of many others were found, particularly of the lion and buffalo. On all parts of the coast, near the anchorage, were found the bones of whales in great abundance.

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* "On the surface of this island I saw the effects of a pestilence or plague which had visited the amphibious inhabitants of the ocean with as much malignity as the Asiatic cholera has the bipeds of the land. The whole island was literally covered with the carcases of fur-seals, with their skins still on them. They appeared to have been dead about five years, and it was evident that they had all met their fate about the same period. I should judge, from the immense multitude of bones and carcases, that not less than half a million had perished here at once, and that they had all fallen victims to some mysterious disease or plague."—*Capt. Morrell.*

Subsequently, upon witnessing the phenomenon of a sand-wind and a moving pillar of sand at Angra Pequena, which, passing near his vessel, raised the thermometer to 113°—"This startling phenomenon induced me to waver in my former opinion respecting the visitation of a plague or pestilence on the unfortunate seals before mentioned. Is it not more probable that they were overwhelmed and suffocated by one of these sand-spouts bursting upon them, accompanied by the sultry, stifling sand-winds which created it? Such a cause would be more than sufficient to produce the effect alluded to—the simultaneous destruction of millions of these amphibious animals, assembled on the surface of the two islands at the head of this bay (Angra Pequena), which are literally covered with the decaying carcases of the victims, with their skins still about them."

† A dangerous rock, called by its discoverer, Captain Michel, the *Heliopolis Rock*, lies in the North part of the anchorage, 2¼ miles North of the S.E. end of Possession Island.

‡ The description, &c., of the coast from Walvisch Bay to this have been corrected from the Instructions of M. le Capitaine Saisset, of the French Marine.—*Annales Hydrographiques*, 1850.

Whale Bay is in lat. 27° 22', and is merely an indentation of the coast, without any shelter. Landing is easy in the South part of the bay, and cattle may be got from a Hottentot village, 12 miles inland.—(*Captain Livingston.*)

Angras Juntas.—Captain Morrell says: At *Angras Juntas* there is a small bend in the land, running in to the eastward about a mile, the width of its mouth being about a mile. Here ships may find tolerable shelter, with southerly winds. Captain Messum, who visited the spot at a much later period, says that the cove has since filled up.

Northward of the Orange River, which is in lat. 28° 38', the coast presents a chain of islets and rocks extending in-shore, and bearing the most fantastic shapes. In particular, there is one granitic rock, in lat. 27° 20', which seems originally to have been of some height and extent; but the sea or some other cause has carried away the whole of its centre, excepting a surface of about 20 feet deep, which rests on the two extremities, leaving between them a vast archway or natural bridge, upwards of 100 feet in height, and apparently capable of allowing a ship to sail under without lowering a mast.

A very heavy surf was seen on the Bar of Orange River and along-shore. Although a vast space of water was seen over the foaming bank, yet no entrance for a boat could be found.

The ORANGE or GARIEP RIVER is the largest river of Southern Africa; it rises on the eastern side of the continent, and its mouth is in lat. 28° 38½' S., long. 16° 27½' E. Captain Sir James Edward Alexander visited the mouth of it in his expedition. He says that the land is flat about its mouth, and on the North side is good pasture. The breadth of the entrance, at the beginning of November, was about 170 yards, whilst inside was a lake about 4 miles across, and abounding in wild fowl. The air was darkened, and filled with the cries of wild geese and ducks, flamingoes, pelicans, gulls, &c. Here is most excellent shooting ground for the sportsman, and "harder" and "springer" fish abound for the seine.

"I saw no rocks at the mouth of the Orange: there is probably a shoal of sand outside; but, with care, it seems that the mouth of the river could be entered by a schooner. Copper ore of extraordinary richness, is found near the South Bank, about 4 days' journey from the mouth, and iron ore is also abundant in its neighbourhood. Honey is found in very large quantities about the Orange River, particularly in December and January. The climate is very healthy for Europeans."

The fact that the Orange River is (perhaps) hopelessly barred, is a very serious drawback to the vast resources which exist in the country it drains; were it otherwise, it would be the most important river of South Africa. Extensive and most rich copper mines have been discovered near its banks, and nothing but the means of transport and embarcation prevents them becoming the source of wealth.

Its entrance has even more than once, within the memory of the present generation, been closed up entirely, whereby a sudden inundation overflooding the country has given it the appearance of a vast lake. Near its embouchure this river expands to a breadth of about 4 miles, and is dotted over with numerous reedy isles.

Of the Orange River that portion alone is navigable which very nearly adjoins the sea, and then only for small craft, and at certain periods of the year: in the dry season shoals and sand-banks are everywhere visible in its channel. Even higher up the navigation is frequently impeded by rapids and waterfalls, some of which are very grand and beautiful.

The coast between Orange River and Voltas Bay is very low, sandy, barren, and desolate, It retains this appearance for some distance from the shore; but after running back 6 or 8 miles, it begins to swell into hills; and still farther back it rises into lofty mountains, which stand on each side of the river, on the banks of which are a few Namaqua villages. The wealth of the inhabitants consists of herds of cattle and flocks of sheep.

THE CAPE COLONY.

The Cape of Good Hope was discovered by Bartholomew Diaz, in 1487, who named it *Cobo Tormentoso*, or the Stormy Cape, on account of the boisterous weather which he experienced near the coast, which prevented him from making the land. But John II., King of Portugal, entertaining no doubt of his having found the long-desired route to India, gave it a name of better omen, viz., "The Cape of Good Hope." Accordingly, his successor, Emmanuel, despatched Vasco de Gama, who, in 1497, first proceeded round it to India.

After the discovery of the cape, the Portuguese fleets continued for several years to resort to various bays of the present colony for the purposes of refreshment. In 1614, the English attempted a settlement with a few convicts at Robben Island, in Table Bay, but it was soon broken up. In 1620, the English finding a Dutch fleet in Table Bay, took formal possession of the place. In 1648, Van Riebeck, a surgeon, touched here on his homeward passage; he induced the Dutch East India Company to form a settlement here, as a rendezvous for their vessels. Accordingly he sailed as the founder of the new colony, where he arrived on April 6th, 1652. After a peaceable possession of the colony by the Dutch for 143 years, possession was taken of it by the English on the 16th of November, 1795. It was again taken on January 10th, 1806, and was finally ceded to the English in 1815.

CAPE VOLTAS, in lat. 28° 44', is 2 leagues to the southward of Orange or Gariep River. According to Captain Morrell, Cape Voltas is a high bluff point, projecting into the sea; and there are several rocks lying about half a mile to the West of it, beyond which there are no dangers. About 1 mile North of the cape there is a small bay, not more than 2 miles in length, and 1½ in width; within which the anchorage is not safe, as the ground is foul, and heavy rollers are continually heaving in from the westward at all seasons of the year. Ships, however, which are in want of fire-wood, may lie off and on, and obtain any quantity from the head of the bay, where they will find immense quantities piled up on the beach, which come down the Orange or Gariep River.

The land around the cape, and to the South as far as the Koussie River, is high on the sea-board, running back into elevated mountains.

It has been said that there is no fresh water to be had on this coast North of Cape Voltas, but this is an error, as any quantity can be had in Voltas Bay in the rainy season, without the trouble of searching for it under ground. But by digging, fresh water may be had at all seasons of the year at a short distance at the head of the bay, where the landing is very safe and convenient, sheltered by two small islands lying close to the beach, inside of which the water is perfectly smooth.

Cape Voltas is commanded by two high hills, called the *Bramidos Mountains*, the highest of which is remarkable for the regular and rounded form of its summit.

At 15 miles S.S.E. of Cape Voltas are two rocks nearly awash, lying 3 miles off shore, on which the sea usually breaks. They are called Cape Voltas Rocks, but are, probably, the *Socos Rocks*, of the old charts.

From Cape Voltas the coast trends South [*S.S.E. ½ E.*], 28 leagues, to the *Koussie River*, where some Hottentots may be found, near the parallel of 30°. The space between is very hilly, and to the southward appears in high broken mountains.

The Koussie, or Kowsie River, may be entered in boats, but only at high water. It is closed at times, however, in the dry season, by the shifting of the sandhills in windy weather. This may well be called Salt River, as the salt water runs up it about 15 miles, 19 miles of which is very shallow. This is the northern boundary of the *Cape Colony*.

The coast continues in the same direction 30 leagues more to the southward, or lat. 31° 21′; in which space are some small rivers and extensive sandy plains. The rivers are *Zwarte Lintie*, 6½ leagues southward of the Koussie.

Hondeklip Bay is in lat. 30° 21′ South, and long. 17° 17′ 30″ E., near the mouth of the Zwartlintje. It is frequented by vessels coming for copper ore. The following directions are by Captain J. R. Mc Dowell, 1864, and are added to a sketch of the bay, published by Mr. C. Wilson. In coming to the first land it is desirable to make a low hill about 18 miles South of Hondeklip (or the Dog Stone, 17 feet high), on which is a cairn or pile of stones called Maclear Tower. The white sand patches on the coast below this hill present a very marked feature, being peculiarly forked.

At the back of the tower, about 50 or 60 miles inland, high mountains can be seen on a clear day. The northernmost of the range is Kamiesberg, 5,000 feet high, and when Maclear's Tower bears East the Kamiesberg will be about E.N.E. It is not advisable to approach the coast too closely here, as several rocks and reefs project far out from the shore, at least to 3 miles.

Having made this land, if at evening, it will be prudent to heave to, or keep under easy sail, with the ship's head off shore, as the current may sweep her past Hondeklip in the night; but if with good daylight and breeze she can continue along the coast northward. The first peculiar appearance will be Roodewall Bay, with its high precipitous red sandstone face. Roodewall Bay is merely a boat cove 12 miles South of Hondeklip. You will then shortly sight the White Beacon, about a mile South of Hondeklip, which is reared on a rocky point projecting seaward.

The anchorage beacons, red and white pyramidal with a mast in the centre of each, will then be before you. They are erected to enable vessels to bring up without a pilot, should the weather prevent a boat crossing the bar. By bringing these two anchorage beacons in one S.E. ¼ S., and anchoring on that line (*nothing to the South of it*), in not less than 20 and about 22 or 25 fathoms water, and about 2 miles off shore, you cannot err. In the winter it is advisable to bring up a little to the northward of this line. The Hondeklip will bear S.E., and the White Beacon S.S.E.

A boat will always be sent off when a vessel approaches, should the bar be safe. The signal staff is in the bight of the bay near to the jetty, and signals made will be duly replied to.

The current on the coast usually sets to the North, but after a long continuation of northerly winds it sets to the South.

South of Hondeklip Bay is the *Groene River*, in 30° 52′; between them, in about lat. 30° 20′, is *Rooe Wall* (*Red Wall*), or *Mitchell Bay*, surrounded by cliffs of red sandstone, hence its name. It is at the mouth of the *Spook River*. There is good anchorage for schooners and small craft in this bay.

From the point of coast above noticed, in lat. 31° 21′, the coast trends more to the eastward; and at 8 leagues south-eastward from that point we find the mouth of *Olifant*, or *Elephant River*, in 31° 37′ S. Four leagues southward of this is a cove named *Donkin's Bay*, the South point of which is Cape Donkin, in lat. 31° 54′ 12″. A little sandy cove, *Lambert's Cove*, is 3 leagues true *South* from Cape Donkin; and a small, though high and bluff headland, *Cape Desejado*, or *Deseada*, is nearly 5 leagues in the same direction from Lambert's Cove.

ST. HELENA BAY.—Paternoster, or St. Martin's Point, lies in lat. 32° 42′ 12″. This point forms the western side of St. Helena Bay, which lies between it and Cape Deseada; the distance between being 10 leagues. In the bay are regular soundings of 12 to 10 fathoms, decreasing to 6 and 4 near the shores. The ground is mostly of sand and shells. It is, however, to be observed that the whole of the western shore to the bottom of the bay, is bordered with a continued reef of rocks, half a mile in breadth. This reef terminates at *Berg River*, which falls into the bottom of the bay, and has a few houses on each side, with several springs near it, the water of which is said not to be wholesome.

There are three principal anchorages in St. Helena Bay, all in the S. or S.W. part of it. The first is that of the Berg River, at 3 miles from its mouth, in 5½ fathoms, with its East point bearing E.S.E. ½ S., and Point St. Martin, N.W. by W. ¼ W. The second and best anchorage is one mile off shore, near the meridian of the Resident's House, in 7 fathoms, Cape St. Martin bearing N,W. by W. ½ W. The Resident's House is at the bottom of a small bay, 6 miles from Cape St. Martin, to the E. of which is a high hill called *Partridge Hill*. The third anchorage is before *Stump Nauss Bay*, a small cove 3 miles from Cape St. Martin, in 9 fathoms.

The *Britannia Rock* is a danger first found by a ship of that name striking on it, and which was compelled to run ashore in Stump Nauss Bay. The position assigned to it was 13 miles *true* North of Cape St. Martin, but may not have been very exactly determined. Another rock is placed 4½ or 8 miles N.W. ½ W. from Point Paternoster, called the *Walton Rock*, and, lastly, on Captain Owen's chart, there is a rock marked at 14½ miles N.W. ¾ W. from Cape St. Martin. The dangers here indicated are not well determined.

The *Berg River* passes through some of the richest districts of the Cape Colony, and on its banks are some of the best wine districts, particularly one called the Vale of Drakenstein, from which two-thirds of the wine brought to Cape Town is derived. Its water is peculiarly wholesome, and well adapted for shipping. The casks may be floated up with the flood about 5 miles, and then filled and floated back to the ship with very little trouble.

In summer, when southerly winds prevail, the anchorage here is safe; the bay being open only to winds from between the North and West. It is equally unsafe during the winter, when north-westerly winds may be expected. It is high water here at 2ʰ 30ᵐ. The variation is about 29° 30′ West.

St. Helena Bay is, therefore, a very good harbour in the S.E. monsoon—its only recommendation, as nothing can be procured in the shape of provisions. The ruins of two or three houses are the only indications of human beings having once dwelt in this land of desolation; for not one speck of verdure relieves the eye in its trackless wanderings over the desert. At a short distance inland, within Cape Deseada, the country rises into abrupt craggy eminences and broken ranges of lofty hills.

A broken and rugged coast extends for 7 leagues, nearly true *South*, between St. Helena Bay and *Saldanha Bay*, in which are several small coves, and some rocks, at a considerable distance from shore.

The first of these coves is *St. Martin's Bay*, to the West of the cape, but which affords no shelter. A reef extends off it, and ships should not come into less than 34 or 35 fathoms to pass these breakers. Beyond this the coast forms three projecting rocky points, with as many slender bays between them, the last of which is called *Paternoster Bay*, at the bottom of which is a building called the Custom House. A road leads from it to the Berg River. The bay has only indifferent shelter for boats.

Point Paternoster is the West point of the last named bay, and also the N.E. limit of another bay, whose southern point is called *Castle Point*, which owes its name to the singularly formed hill which surmounts it. *Castle Bay*, as this is called, is 5 miles wide, has a sandy beach, but no shelter. A fisherman's house stands at the bottom of it. To the West of Castle Point is a group of islets surrounded by a line of breakers called the *Paternoster Rocks*. These breakers extend for 2 and 2½ miles from the shore.

Jacob's Bay is a slight indentation of the coast to the South of the latter. It is 4 miles wide, and its South point has a reef running off it for 1½ miles. In the middle of the bay is a breaker which shows, lying S.W. by W. ½ W. 2½ miles from Castle Point. W.S.W. 5½ miles from the same point the charts show another reef called the *Duminy Rock*; this rock lies with Castle Point, and a bold projection called Witte Klip, bearing E. by S. *Brenton's Bay* is 5½ miles South of Jacob's Bay, the coast between being rocky. The bay is small and very dangerous, from the heavy swell and baffling winds which prevail. *Baven Point*, surmounted by a sandhill, is 1½ mile South of Brenton's Bay, and hence to Saldanha Bay, 3 miles distant, are numerous rocks and breakers, the chief of which are Bermudas and France Islets.

SALDANHA BAY.—The entrance of this fine harbour, through a ridge of granite hills, lies between 33° 3′ and 33° 6′ South. Its North point is in long. 17° 48′ 30″. On its North side, at the entrance, is a little isle called *Malagassen*, and on its South side another called *Jutten*. Two miles and a quarter eastward of *Malagassen* is a similar isle, *Mascus*. These isles are too low to be discerned at a distance, and in steering for the bay the latitude will be the best guide. The entrance is broad and clear; but Mascus may, if requisite, be passed on the northern side. It may be approached to half a cable's length. The wide passage on the South is, however, to be preferred. A bay to the N.W. of Mascus is called *Bavian's Bay*; and another, more to the northward, *Houtjes*, or *Hoetjes Bay*; these are divided by a promontory, which terminates in sunken rocks. On this cape, *Point Houtjes* a signal-staff was erected in 1845.

In the principal channel, between Jutten and Malagassen, the least depth is 13 fathoms, bottom of sand. Mascus, with the North and South points of the main land, are bold-to. Within 50 fathoms of the island are 6 and 7 fathoms, clear ground; but within 50 yards are also 7 fathoms, and foul ground; the same from the island to the North point of the main land, forming Houtjes Bay, off which, at about a cable's length, is a rock, not larger than a small boat, dry at low ebbs.

In Houtjes Bay, on the North side, there is good anchorage for the largest ships; and there is deep water on the West side of it, close to a natural pier of granite. Here ships may lie in perfect, safety, in all seasons. Those in want of careening, or repair, are sent hither from the cape.

Houtjes Bay has regular soundings at 5½ and 4 fathoms, sand and shell, with from 7 to 10 fathoms to the eastward. The best anchorage is in 6 fathoms, with the West end of Mascus and the southernmost extremity of the bay in one; or a little further in, in 5 fathoms, where you will be completely sheltered. It is here to be noticed, that S.E. 3 miles from the point forming the bay, is a sunken rock, called the *Blinder-klip*, which is not visible even at a low ebb, when there is 3 feet of water over it, unless the wind blow strongly. The distance of this rock from the sandy beach of the main is more than a mile; the depths between, from 7 to 4 fathoms, sand and broken shells. The Blinder-klip lies with the Mouse Back (a high piece of land on the northern shore) and Mascus Island in a line.

At the entrance of the lagoon, on the South of Saldanha Bay, are two islands, Schaapen (*Sheep*) and Meeuwen (*Mew*); 2 miles within these, on the western shore, is the Government Residence, the channel to which cannot be attempted by verbal directions only. In working up to Schaapen, keep your lead going, as the soundings to the north-eastward are regular, and will be your best guide; but, in standing back to the S.W., bring the N.W. end of Schaapen Island in one with a saddle hill on the western side of the lagoon, and then put about, as the water shoalens quickly afterward.

Saldanha Bay is an excellent place for ships that require the repair of any damage caused by stress of weather at sea. Bullocks and sheep may be obtained from the farmers at a moderate price; and plenty of fish may be caught, either with the net or with hook and line. The inlet called *Riet Bay*, on the S.W. side, is the best place for the net and seine, it having only 6 or 7 feet of water, with sandy ground. To other places, being rocky, the hook and line only are adapted. The islands swarm with wild rabbits.

Saldanha Bay is one of the finest harbours in the world, but, from the want of water, has been little frequented. Sir John Barrow, impressed with its importance for naval purposes to England, proposed a canal to be cut from the Berg River, which falls into St. Helena Bay, to the N.E. corner of Saldanha Bay, and thus obtain a plentiful supply of excellent water. But the necessity of this has been removed by the discovery of a copious spring on Schaapen Island, in 1841. On tracing this up, it appeared that the fountain had evidently been discovered many years ago, but carefully concealed; and in working to its source it was found it had been purposely sealed by masonry with cement, and its course carried through a channel into the sea, 11 feet below low water-mark, evidently with the intention of hiding its existence. The supply from this spring, now released, is said to be most copious, and equal in purity to that of Cape Town, to which the Portuguese discoverers gave the significant and well-deserved name of Rio Dulce.

The time of high water in Houtjes Bay is 2ʰ. The rise is from 6 to 7 feet.

Dassen or Coney Island. in lat. 33° 26′, lies about 7 leagues to the southward from the entrance of Saldanha Bay, at a league from shore, and W.S.W. (*W. by S. ½ S.*) of a headland named *Eyserberg*. It is a low sandy island, the resort of innumerable penguins. The shore is foul on the West side, with breakers that run out half a league into the sea, but fair on the East side; and, on that side, in 16 fathoms, at about a gun-shot from the shore, the bottom is of white sand, with good anchorage.

ROBBEN or Penguin Island lies at the distance of 8 leagues South (*S.S.E. ¾ E.*) from Dassen Island, and 5 miles northward from the lighthouse on the South side of the entrance of Table Bay. It is rather higher than Dassen Island, and about 2 miles in length from North to South. The western and southern sides are surrounded with heavy breakers, and a sunken rock, called the *Whale*, lies at the distance of a mile from the southern point. Ships may anchor off the eastern side of the island, in from 10 to 12 fathoms, at 1 or 1½ miles from shore, or within three-quarters of a mile from the island, in 9 or 7 fathoms, and sheltered from a S.W. swell by the island and reefs. The best position for a large vessel is with the Whale Rock (on which the sea almost constantly breaks) open to the eastward of the South point of the island, bearing S.W., and the North extreme of the island N.W. ½ N. in 8 or 9 fathoms. Smaller vessels may be closer, with the Whale Rock shut in by the S.E. point of the island in 5 or 6 fathoms. A ship may thus lie until the wind comes to S.W. or West, which generally happens in the morning during the fair season; then weigh, and, if requisite, reach the anchorage in Table Bay. A vessel may also find good shelter from a N.W. wind under this island, when, on the contrary, she would be quite exposed in Table Bay.

The island, as above stated, is of moderate height. *Minto Hill*, the highest and S. point of the central ridge, is 106 feet high.

The LIGHTHOUSE on Minto Hill shows a *fixed* white light, at an elevation of 154 feet above the sea, and in clear weather should be seen at a distance of about 20 miles. The illuminating apparatus is dioptric or by lenses, of the first order. The tower is round, white, 76 feet high from base to vane, in lat. 33° 48′ 52″ S., long. 18° 22′ 33″ East of Greenwich.—(Jan. 1st, 1865.)

The General Infirmary for lepers, lunatics, &c., is on the south-eastern part of Robben Island, and there are generally about 300 of these unfortunate patients here, who of course are kept under strict supervision as to visitors. There is a landing cove near the hospital, but the best is in Murray Bay, on the N.E. side.

BLAAUWBERG is a dark round hill, rising to an elevation of 745 feet, at 1¼ miles inland from the main shore opposite Robben Island. It is 5⅜ miles from Minto Hill, and may be considered the northern boundary of the approach to Table Bay. The channel between Blaauwberg Beach and Robben Island is 3¼ miles in width, but the narrowest part, between the 7-fathoms line (within which no vessel should venture), is 2½ miles, with soundings from 7 to 10 fathoms.

To the southward of Blaauwberg the shore for 2 miles is composed of a number of white sand hills, 100 to 200 feet high; it then gradually curves to the south-westward for 6 miles, to the mouth of Salt River. The whole of this space is very deceptive to vessels standing into the bay at night, or in hazy weather, from the close resemblance the sand bears to the water. From this cause many vessels, *disregarding the lead*, have been stranded or wrecked midway between Blaauwberg and Salt River.

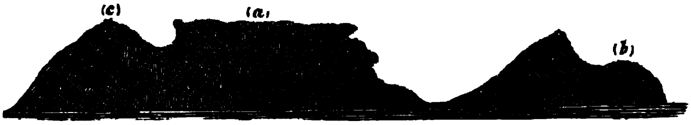
The mouth of *Salt River* (which is fordable in summer, but very dangerous in winter, it being an extensive quicksand, in which both men and cattle have perished), is in the south-east bight of Table Bay, and S.E. ¼ E. 3⅛ miles from Mouille Point Lighthouse. Another winter mouth to the river is formed E. by S. ¾ S. 3½ miles from Mouille Point, and fronted by a rocky reef, with 3¾ to 5 fathoms over it at the distance of three-quarters of a mile from the shore. The sea breaks over this spot after heavy N.W. gales; with this exception, the water shoals regularly from 8 fathoms to the sandy beach between Blaauwberg and Salt River. There is nothing to distinguish this winter mouth, but Salt River has a large white farm-house close to its entrance.

A range of tolerably even hills, called the *Tigerberg*, 1,350 feet high, and 6 miles in length, extends N.N.E. and S.S.W., 5 miles within the eastern sandy shore of Table Bay. With the exception of Blaauwberg, these are the only elevations in the neighbourhood of Table Bay North of Table Mountain.

CAPE OF GOOD HOPE.—The southern promontory of Africa, commonly called the CAPE of GOOD HOPE, is a peninsula, about 28 miles in length, composed of a vast mass of mountainous and rocky land, between the latitudes of 33° 53′ and 34° 22′ S. The North end of the promontory forms TABLE BAY, on the South coast of which stands CAPE TOWN, having near it, on the West, the *Lion's Mountain*; at 2 miles from it, to the South, the *Table Mountain*; eastward of which is the *Devil's Berg* and other elevations.

The Cape Peninsula may be said to be composed of two mountainous tracts, separated from each other, and from the main, by an isthmus of low sandy plains, 11 miles in breadth, dividing Table Bay from False Bay.

The northern tract is composed of the famed Table Mountain, that of Constantia, and several others of less note, and contains many very valuable estates, particularly those of *Constantia and Hout Bay*; while on the southern range, from Hout and Fish-hook Bays, southward, to the Cape Point, there is not one estate valuable for its productions, although the land is capable of great improvement."—*Owen*.

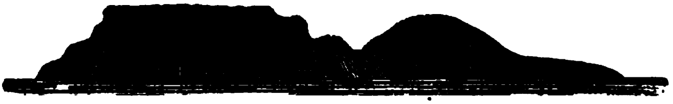


The Land over Table Bay. (*a*) *Table Mountain.* (*b*) *Lion's Rump.* (*c*) *Devil's Berg S.S.E.* 12 *leagues.*

The Cape of Good Hope, on approaching either from the westward or the eastward, has the appearance of a large island, when you are at such a distance as not to be able to discern the connection between its mountains. Of all the land, the highest and most remarkable is the Table Mountain, which appears quite level, and falls down perpendicularly at both ends, till it joins the high lands near it. It may commonly be seen in the offing at the distance of 10 leagues, and in very clear weather may be discerned at 15 leagues.

Here it is to be noted, that an eddy current commonly sets from the northward into Table Bay, between Robben Island and the shore; while, at the same time, the regular current is setting around the cape and to the north-westward. Vessels bound to Cape Town, therefore, make the land to the southward of the bay; from want of this precaution some have driven as high to the northward as Dassen Island, a distance of 10 leagues.

The offing westward of the Cape Peninsula has not been thoroughly sounded. From what has been done, it appears that at 4 miles from shore there is no bottom at 40 fathoms, and off the high land north-west of Hout Bay there is no bottom at 40 fathoms at 1¼ mile from shore. From Hout Bay to the cape the water is less deep: the depth varies from 24 to 10 fathoms, rocky bottom, at from 1 to 3 miles off shore. The precaution, therefore, of using the lead when approaching the cape should never be omitted if doubt exists as to the accuracy of the vessel's position.



The Table Land, bearing N.E. ¼ E. [N.N.E.] distant 15 leagues.

The Table Mountain is composed of a sandstone of many colours, but chiefly of a white granular quartz, passing in some places into quartz rock. The mountain rests on a granite base, which is passed at the waterfall a little above the mill, and at the elevation of 500 feet above the sea. There are vast blocks of granite in Camps Bay, on the West side of the mountain; and it appears to lie N.W. and S.E., traversing the Kloof from the Lion's Head, appearing abundantly in Table Bay.

The principal annoyance, it appears, to which one is subject, in visiting the summit of the Table Mountain, is that of being overtaken there by a S.E. wind. This unwelcome breeze brings a chilly atmosphere from the cold regions of the South, and immediately produces a dense mist, which obscures the view. A party caught thus, if they are not very careful in making good their descent from the mountain, very easily loose their road, and are soon bewildered; indeed, accidents are known to have happened from this very cause, by which persons, having lost their way coming down, by one false step have been precipitated from the mountain and killed.

During the summer season at the cape, the S.E. is the prevalent wind. It is, in fact, analogous, in some degree, to the trade-wind and sea breezes of the tropics; but we must be careful to confine it to the southern and eastern coasts—it then becomes a true sea breeze, or a rush of cool air upon the heated plains. But there is a remarkable circumstance connected with the S.E. wind at Cape Town, viz.—the dense mantle of vapour above mentioned, which rests upon Table Mountain, and rushes over its precipitous sides like a cataract of foam and vapour. This peculiar appearance is called by the inhabitants the *Table Cloth, or Cap;* and by the French the *Perruque.*

The well known meteor and its cause is described by Sir Thomas Maclear, thus:—

By observation it appears that the temperature of the air decreases nearly 3°.38 for each 1,000 feet of height, or about 300 feet for one degree of Fahrenheit's Thermometer. If, therefore, the stratum of air in the ordinary humid condition should be suddenly lifted 3,600 feet, viz., to about the height of Table Mountain, its temperature would be lowered by 12°, and a portion of the humidity would be condensed in the form of cloud or fog, irrespective of each cubic foot becoming lighter by about 61 grains.

The strong and occasionally violent southerly winds which prevail during these months effect the displacement. Table Mountain, like a huge wall, receives some 4 miles in breadth of the current, which bounds up with diminishing temperature, and deposits the celebrated "table cloth or cap" on the top.

The upper surface of this majestic white cap is smoothed off like a well dressed peruke: its North border hangs over the precipice, drapery fashion; but during very strong winds it pours down like a cataract to about 1,000 feet from the top, where entering a warmer temperature, it dissolves and disappears.

Not the least interesting of the phenomena occasionally attending it is the *revolving* mass of detachments which hovers over Cape Town, fed by a stream of shreds from the cap on one side, which are disbursed or thrown off on the other, and float towards Table Bay, where they disappear.

The "black south-easter" cap differs from the preceding by the *nimbus* tint of a canopy of cloud, which projects on the southern side of the mountain over Rondebosch and Claremont, and from which light rain occasionally falls.

The strong southerly winds are ushered in by the *tops* of the higher elevations on each side of False Bay becoming covered in rapid succession from the southward; but these elevations seldom remain covered throughout the gale.

The mean temperature of the winter months—June, July, and August—is 56°, the *humidity* 81°.2, and the temperature of the *dew point* 49°, viz., 6° below the mean temperature of the air. The prevailing winds are from the North, north-west, West, and occasionally from the south-west; and they are generally accompanied by rain. Hail-storm squalls are usually from the south-west. As seen from the Observatory, the first indication of a "north-wester" is the appearance of a mass of condensed vapour rolling over the "Lion" hill, and enveloping the signal station, also the air feels damp, and a swell sets into Table Bay; the tops of the ridges bordering the shore in the direction of Hooghtes Bay become covered, and next, but not always, Table Mountain.

Strong wind with squalls, and showers, more or less heavy, follow these harbingers, and the fogs which now cover the elevations are of the usual European cast. The phenomena which are characteristic of *warm dry* air being forced upwards by strong wind and again descending, are here entirely wanting.

The duration of a north-wester fluctuates between two days and a week, sometimes ten days.

The violent S.E. wind is to be guarded against in entering Table Bay; for it is not unusual for vessels, during its continuance, before arriving at Green Point, to have light breezes; and upon opening the bay to the S.E., and coming beyond the shelter of the Table Mountain and the Devil's Berg, to be obliged to let fly all sail to save their masts from the fierce south-easter sweeping over the land into the bay; therefore, it is prudent to shorten sail in time to avoid accident, and the appearance of the table as above described may perhaps give some indication of what may be expected.

TABLE BAY.—The sheltered portion of this bay, from the prevalent winds from seaward, is in the S.W. angle to the southward of Mouillé Point. In ordinary weather it is a safe and convenient anchorage. but in S.E. or N.W. gales it becomes dangerous.

A Breakwater has been commenced to give a much greater amount of shelter to shipping, and that at seasons when anchorage in the open bay is hazardous. It runs off from the shore about half a mile southward of Mouillé Point, and is, or was, intended to carry it out in an E. by N. direction for half a mile, or into 40 feet at low water, which of course will become a formidable undertaking. In connection with this pier, docks and basins are to be excavated under its shelter, which cannot fail of being most useful to the commerce of the colony.

Much has been said and written on the comparative advantages of Table and Simon's Bays; they both have their advantages. One drawback to Table Bay is the occurrence of the S.E. gales, which however do not last long, and their effects may be avoided with prudence and care.

Table Bay is an excellent place for all kinds of refreshments; wood is scarce and dear, but there is plenty of good water. Sheep may be obtained at very moderate prices, with other provisions, vegetables, and fruits. If bread is wanted in large quantities, it will be baked in a short time. The water is brought down in pipes to the head of the jetty near the castle, where boats fill it with hoses leading from the pipes to their casks: but there are several vessels, with tanks, force-pumps, hose, &c., fitted up for conveying water to the shipping in Table Bay. The water is excellent; and in the flourishing days of the Dutch East India Company the men-of-war of that nation, which frequently put in here, were compelled to bring home a few pipes of it for the use of the Royal family. The air is here generally cool in the night, although the sandy soil is greatly heated by the sun during the day; and this causes land winds from Table Bay to come off in hot gusts in the evenings, when their course is over such ground.

The water of Table Bay exhibits a very different appearance, according to the quarter from which the wind blows. With a N.W. wind the water is dirty red and turbid, as if mingled with a small quantity of blood. After a S.E. wind, on the contrary, the water is so beautifully pellucid, that the anchor, by which a vessel is riding in 10 fathoms, may be distinctly seen from on board.

Table Bay is also much exposed to the wind and sea from the N. and N.W. during the winter season, when the wind prevails from those quarters, and sends a heavy swell into the bay.

CAPE TOWN lies in the bight of Table Bay, and affords many advantages to shipping. It is in electric telegraph communication with the Cape Lighthouse, and with many other portions of the Cape Colony, so that the passing ships can be reported here. There are repairing ship-yards here, adapted for all ordinary requirements, and there is a slip for hauling up vessels of 13 feet draught. Water is easily obtained and excellent, as before stated. Coal is abundant, and put on board at from 45 to 60 shillings per ton.

The *Royal Observatory* is a large and handsome structure, situated about 2½ miles East of Cape Town, on a flat sandy heath. The central part of the building is allotted to the instruments, and the two wings form the residences of the astronomer and his assistants. It was erected under the superintendence of the late Mr. Fallows, at an expense of £30,000. It is in lat. 33° 56′ 3″ S., long. 18° 28′ 45″ E., or $1^h\ 13^m\ 55^s$ East of Greenwich. In front of this is the time-ball apparatus, hereinafter described.

Boat hire at Cape Town is very expensive; the surf, however, is sometimes very dangerous, and therefore those who brave it have a right to demand a proportionate reward. There is landing at the jetty, which is close to the citadel. There is a causeway adjoining the custom-house, and there is a stone pier to the N.W., near the Amsterdam battery.

It is extremely dangerous to remain in Table Bay after the 10th or 15th of May, for the N.W. winds may then be expected to set in, and they blow so violently that no ship can possibly ride them out. The Dutch never suffered their ships to be there after that time. N.W. gales are experienced in every season, but they seldom blow home in the bay from November to May; and several ships have been driven on shore by them, even in the month of April.

The astronomer royal, Sir Thomas Maclear, remarks on a tabular summary of the winds observed for 14 years, as follows:—

The direction of the wind was observed four times daily, January 1, 1842, until the 1st of October, 1851; afterwards, five times daily, till January, 1856; but the totals cannot agree with this system, since "*calm*" has no direction.

The direction is almost exclusively from seaward, viz., from S.E. to N.N.E. through West. The register furnishes no instance of strong winds from the eastward, only a very light air (and that rarely) when the wind is changing.

The southerly winds are dry, strong, and occasionally violent.

The south-westerly are in squalls, and generally accompanied, or followed, by rain or hail.

The north-westerly winds are in general strong, sometimes violent, and almost invariably followed by rain. It is this wind which is dangerous to the shipping in Table Bay.

To the frequent winds may be attributed, in a great degree, the noted salubrity of the cape climate, particularly the absence of those fevers of the bilious remitting type, which in many other countries are produced by marsh miasma, or by continued calm hot weather.

The putrid exudations from the ground are scoured off—the unhealthiness which springs from inattention to domestic cleanliness is greatly diminished—and the depressing effect of summer heat is considerably reduced.

The inhabitants, thus favoured, should not grumble at a little discomfort from shifting dust, nor indulge regret that vegetation is not always green.

LIGHTS.—Green Point Lights.—A lighthouse stands upon Green Point, the western extreme of Table Bay. It is a rectangular building, 400 yards within the rocks at low water, and exhibits a white light, showing a *flash* every *ten seconds*, at an elevation of 65 feet above the sea, visible, in clear weather, at a distance of 13 miles. The illuminating apparatus is dioptric or by lenses, of the third order.

Mouille Point Light.—From Green Point the land trends E. by S. ½ S. to Mouillé Point, the north-west Horn of Table Bay, upon which is erected a new lighthouse at 1,195 yards from Green Point Lighthouse. A *fixed red* light is exhibited from it at an elevation of 44 feet, visible in clear weather from a distance of 10 miles The illuminating apparatus is dioptric, or by lenses, of the fourth order. The tower is round, 30 feet high, and painted in alternate red and white bands.

BREAKWATER LIGHT.—During the construction of the breakwater, a fixed *green* lens light of the 6th order is placed on the staging forming the outer arm of the works in progress. This light is placed at an elevation of 25 feet above high water, and is visible when bearing from South, round by West, to North. It will not be seen until vessels are eastward of Mouillé Point light.

The light is intended to guard vessels entering Table Bay from a too close proximity to the breakwater, and will be shifted outwards as the works proceed.

There is (or was) also a *red light* at the commencement of the North jetty, and a *green light* (only shown during northerly gales) at the commencement of the old South jetty, as will be hereafter alluded to.

A TIME BALL has been erected at the flagstaff, before the South front of the Observatory, for the purpose of daily (Sundays and Good Friday excepted) communicating to the ships in the harbour the instant of 1^h Cape mean time, which corresponds to 11^h 46^m 5^s Greenwich mean time.

As the rate of a chronometer obtained on shore rarely agrees with the true rate at sea (the motion of the ship and other causes producing the alteration), it becomes necessary to ascertain the sea rate after the chronometer has been placed on board in the berth it is to occupy during the voyage, and from which, on no account, should it be removed throughout that period.

The present contrivance furnishes a convenient method for obtaining this important object, without any calculation or difficulty. All that the observer has to do is to point the common ship spy glass to the signal ball a minute or two before 1h, and to note the instant of the fall of the ball from the top of the staff, by chronometer; then 11h 46m 5s subtracted from the time by chronometer gives the error of chronometer, or Greenwich mean time, which, compared with the error obtained at departure, will give the rate during the interval.*

An *additional time ball* has been established at the Lion's Rump signal station, as that attached to the Observatory is not visible from the whole of the Table Bay anchorage, owing to the intervention of buildings. As in the other case, the observer should note the time by his chronometer when the ball begins to fall; and by subtracting one second from that time he will have the moment of 1 p.m. mean time at the Cape Observatory.

When the vessel continues a week or ten days in the harbour, it will be satisfactory to know the existing rate. If the rate should be trifling, perhaps less than the probable errors of observation, it will be right to diminish the latter, by dividing the observations into two or more groups, and to take the mean of each group for one observation; the differences of these means, divided by the intervals of days, will give a determination very close to the truth.

DIRECTIONS.—Vessels bound for Table Bay from the southward should not shut in Cape Point light with the land at Slangkop Point, until Robben Island light—which will be seen before the *flashing* light on Green Point—bears N.E. ½ E., when they may steer for it; and when Green Point light bears East, an E.N.E. course may be followed until the *red* light on Mouillé Point comes open northward of Green Point light, bearing S.E. by S. This route will clear the Vulcan Rock and the reefs in its vicinity. The course may now be altered to S.E. by E. ½ E., which will carry a vessel one mile northward of Mouillé Point light, and within this distance no stranger should round the point at night. When Mouillé *red* light bears S.S.W., a course about S. by E. ½ E. may be steered for the anchorage, bearing in mind not to approach the *green* light on the end of the breakwater too close. When the *flashing* light on Green Point is shut in with the hillocks near Mouillé Point, or Mouillé Point *red* light bears N.W., distant about one mile, a vessel may anchor in from 6 to 8 fathoms water. Small vessels may anchor in 4 or 5 fathoms, with Mouillé Point light bearing about N.W. by N.

Vessels bound to Table Bay from the northward should give Robben Island a good berth, and not be misled by its light, for the island is low, and the dangerous Whale Rock lies S. by W. ½ W., only 1 4-10th miles from the lighthouse, and 9 cables from the nearest point of the island. Having sighted Robben Island light, a vessel should haul to the S.W., if the light bear anything to the westward of South, until the *flashing* light on Green point bears S. by E. or S.S.E., then steer for it until Robben Island light bears N.E., when steer S.E.; and when Mouillé *red* light bears S.S.W. steer about S. by E. for the anchorage.

With Robben Island light and Green Point or Mouillé Point light, a vessel may readily determine her position by cross bearings; but in working for the anchorage the safest and easiest plan to adopt is, whilst Green and Mouillé lights are open of each other, to tack when Robben Island light bears N. by W. ½ W., and when they approach each other or become in line, to tack when Robben Island light bears N. by

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* According to a subsequent notice by Mr. (Sir T.) Maclear, July 7th, 1852, it is shown that the probable error has been reduced from about two-tenths of a second of time to one-tenth part of a second in time; a degree of accuracy more than sufficient for the wants of the seaman, whose ordinary method of noting time admits of no such precision.

W. This will prevent accidents from the low Blaauwbergh Beach, on the eastern shore of the bay, and its deceptive appearance at night. Little, if anything, can be lost in thus beating in by giving up the smooth water near the shore, as a constant northerly current sets out between Robben Island and the main land; added to which, the wind blows with greater violence from the S.E., on the East side of the bay than it does more to the westward, though not in such sudden and violent gusts.

There can be no excuse for neglect of the lead in entering Table Bay, the average depth of water between Green Point and the Whale Rock being 12 and 14 fathoms: and the mid-channel depth, which is the greatest, 20 fathoms only, from which, towards the beach, the soundings gradually decrease. The bottom is foul and rocky to the N.W. of a line joining the Lion's Head and Rump, but East of this it is clear, and a vessel may, if necessary, anchor in any part in from 8 to 10 fathoms, sandy bottom.

In dark or hazy weather, ships should never fail to use the lead in standing into Table Bay. For want of this precaution vessels have sailed upon Green and Mouillé Points without seeing land, whilst their masts were seen over a fog from the elevated ground at the foot of Lion's Rump. The fogs that obscure the lights are frequently confined to the low ground in the vicinity of Green and Mouillé Points, extending upwards only 100 to 150 feet. Under these circumstances it is advisable to send a mast-head man aloft, who will probably see land when it is invisible from the deck.

Strangers are not recommended to beat into Table Bay at night, especially in squally or thick weather. Under any circumstances, at night, there is great difficulty in judging the distance of lights situated under high land. Therefore, the prudent course for a stranger is to keep off and on outside till daylight, sufficiently to the westward of Green Point, to prevent being becalmed near the land, and set in upon the coast by the heave of the sea.

Anchorage.—Should a stranger arrive without being boarded, he may anchor with Mouillé lighthouse bearing N.W. ¼ N., and Devil's Peak, S.S.W. in 6 fathoms, and wait for a proper berth being pointed out by the authorities of the port. From this position the signal-staff on the Lion's Rump will bear W. ½ N.

An anchorage recommended for large ships is in 10 fathoms with Mouillé Lighthouse W. ¾ N., south-east angle of Amsterdam battery S.W. ¼ S., and the Observatory S. by E. ½ E. Vessels in the summer season should moor rather taut, with 100 fathoms on the S.E. anchor, and 30 fathoms on the N.W.: in the winter with 100 fathoms on the N.W. anchor.

The best ground tackle is required in the N.W., or winter season; and during gales precautions should be taken to prevent surging ahead and slacking your cables between the gusts. It is for want of this precaution that most cases of parting occur.

LEAVING TABLE BAY.—Vessels leaving Table Bay and bound North should go out between Robben Island and the main. A current is almost constantly setting to the northward through this channel, and in the summer a fresh south-easter frequently blows, whilst at a few miles to the westward of the island the wind is light and baffling, or fails altogether.

PORT REGULATIONS.—The following are the port regulations, as published by authority, March 1, 1855.

Article 1.—On the arrival of merchant vessels in Table Bay, a proper berth will be pointed out to the masters thereof by the port captain, when he boards them; and no master of a merchant vessel shall shift his berth, without permission from the port captain, unless in cases of extreme urgency, when he shall report his having done so, as early as possible, at the Port Office.

2.—Should it be the intention of a master of a vessel to discharge or to receive on board any considerable quantity of merchandize, a berth will be pointed out to him, as close to the jetty or other landing place as the safety of the vessel and other circumstances will admit; and the master will then moor with two bower anchors, with an open hawse to the N.N.E.; taking especial care, in so mooring, not to overlay the anchor of any other ship, or in any way to give the vessel near him a foul berth. Ships and vessels touching in Table Bay for water and refreshments only, may ride at single anchor in the outer anchorage; but in this case it is particularly recommended to veer out 80 or 90 fathoms, if they ride by a chain cable, as the liability of starting or fouling the anchor or breaking the chain will thereby be greatly lessened; and if riding by a rope or coir cable, to run out a stream or good kedge to steady the ship; and in both cases the other bower anchor should be kept in perfect readiness to let go. When the vessel is properly moored with bower anchors, or well secured with a bower and stream anchors, and with good cables, buoys, and buoy ropes, the master will then take the exact place of the ship by the bearing of two land marks and the depth of water; and should any accident occur, by which the vessel may drift from this situation, or lose her anchors, a good bearing and depth of water must be taken at the time, and the same must be notified in writing to the port captain. It is particularly recommended that vessels be kept as snug as possible, to counteract the effect of periodical winds, which at times blow with considerable violence.

SIGNALS.

3.—The following general signals will only be shown when, from local experience and good barometers, a severe gale may be expected. It is strongly recommended that they be promptly observed when made from the Port Office; and any neglect in the observation of, or departure from, the foregoing instructions, will be reported to the agents for Lloyd's and to the consignees.

GENERAL SIGNALS.

White pierced blue, over union-jack.—Clear hawse, and prepare to veer cable.

Union-jack over white pierced blue.—Veer to a whole cable, and see the third anchor clear.

Blue, white, blue, horizontal, over union-jack.—Down top-gallant yards and masts, and point yards to the wind, and see everything clear for working ship as far as practicable.

Union-jack over blue, white, blue, horizontal.—Strike lower yards and top-masts, and rig in jib-booms.

Union-jack over No. 3, white and red, vertical.—Shorten in cable to same scope as when first moored.

When it is considered necessary to make any of the above signals, it is strongly recommended that all commanders immediately repair on board their respective vessels, and that the above signals may be answered by hoisting the answering pendant, or the ensign at the peak end or any of the mast-heads.

The above signals will be repeated from the Lion's Rump signal station.

Vessels having Marryat's Code of Signals can make their wishes known to their agents in blowing weather through the Port Office; and any assistance required will be strictly attended to, as far as practicable; and vessels not having the code can make the following with their ensigns:—

1st.—Ensign in the fore-topmast rigging.—I am in want of a cable.

2nd.—Ensign in the main-topmast rigging.—I am in want of an anchor.

3rd.—Ensign in the fore-rigging.—I have parted a bower cable.

4th.—Ensign in the main rigging.—I want an anchor and cable.

5th.—Wheft where best seen.—Send off a boat.

Two LIGHTS have been erected in Table Bay; one at the commencement of the North jetty, the other at the commencement of the old South jetty. The former shows a *red* light, and will be lit from sunset to sunrise, and is intended to guide vessels running for the anchorage at night. After having cleared and rounded Mouillé Point, steer until the light becomes visible; the course may then be altered, steering for the light, and anchor in 5 or 6 fathoms, according to circumstances. The latter shows a *green* light, but will only be lit during northerly gales. Should vessels part from their anchors during a northerly gale, and cannot work out, it is strongly recommended to run for the light, and beach close to the southward of the Castle Ditch, the crews remaining by their vessels, by which means little or no danger of life is to be apprehended. It is also recommended that, in the case of such vessels taking the ground, any after-sail that may have been set in running for the beach should immediately be taken in, keeping the foresail or fore-topsail set, as the case may be, until the vessel is firmly grounded.

The following signals may be made from the most convenient point to vessels that are stranded.

In *day-time*, a number will be shown, white upon a black ground. At *night*, the number will be shown transparent.

No. 1.—You are earnestly requested to remain on board until assistance is sent; there is no danger to life.

No. 2.—Send a line on shore by cask, and look out for line from rocket or mortar.

No. 3.—Secure the rope; bend a warp or hawser to it, for us to haul it on shore for the boat, or for us to send you a stout rope, to be made fast to some firm part of the wreck, that we may haul off a boat for bringing you on shore.

No. 4.—Life-boat will communicate at low water, or as soon as practicable.

No. 5.—Have good long lines ready for life-boat, and prepare to leave your vessel; no baggage will be allowed in the life-boat.

Answers to the foregoing Signals.

By *Day*.—A man will stand on the most conspicuous part of the vessel, and wave his hat three times over his head.

By *Night*.—A light will be shown over the side of the vessel, where best seen.

By observations in Table and Simon's Bay, it has been found that the mean interval between the moon's meridian passage and high water is $2^h\ 42^m$. Therefore the approximate time of high water on any given day is $2^h\ 42^m$ after the moon's passage; and it may be found by adding this time to the hour of the "Moon North," as given in any Cape Ephemeris.

The rise and fall is from 5 to 6 feet, which is not exceeded, except under the influence of a heavy gale or hurricane. The time of high water and the range of tide is the same on all the coast between Table Bay and Cape Agulhas.

CURRENT.—A current varying in strength from half a knot to two or three knots, sets to the northward past Table Bay and Robben Island, but during the winter months, when N.W. winds prevail, a current sets into Table Bay from the N.N.W., and impinging on the south-east shore of the bay, about Salt River, divides into two streams, the one setting northward along the coast and out between Robben Island and the main land at Blaauwberg, while the other takes a westerly course as far as Cape Town Castle, then northerly, sweeping the south-west shore of the bay, and carrying away loose soil from the sides of the jetties and projecting rocky points. During the summer season it has been observed, particularly during south-easters, that a gentle stream sets round Mouillé Point to the S.S.E. into the bay, and out by the Blaauwberg Beach, as in the winter. The rocks about the beach from Green Point to the Amsterdam battery are bare, and always free from sand; but in the depth of the bay, from the Castle to the Salt River, vast quantities of sand and seaweed are removed from the beach by the drawback of the rollers, and carried away by the current, leaving the sea-shore a platform of solid rock, which is again covered up to the depth of 2 to 3 feet during the months of summer.

WINDS.—During summer (October to April) the prevailing winds in Table Bay are from the south-east. These winds, although known by the name of south-easters, blow at about S. by E., frequently with violence during the summer season, and more or less in every month of the year, generally bringing settled weather.

When Table Mountain in the summer months begins to be covered with a white cloud, it indicates a strong south easter. In January, February, and March, these winds blow at times with great fury over Table and Devil Mountains, and through the gap between them, driving the white clouds in rolling fleeces like wool over the perpendicular sides of the mountain. On these occasions, vessels not well moored are liable to drive, and bring both anchors ahead. There have been instances of vessels driven from Table Bay by these south-easters with all their anchors down, and not regaining the anchorage for five or six days. When Table Mountain is free from clouds the south-easter will be moderate, and prevails on the eastern side of the bay only, while a gentle sea breeze blows in from sea on the western side of the bay.

The so called "black south-easter" blows from about S.S.W., and is distinguished from the regular south-easter by the nimbus or rain tint of the cloud on Table Mountain. It is frequently accompanied by light rain and cold weather. Black south-easters are very destructive to the vines, and to young vegetation; their appearance the next day being as if withered by frost.

During winter (May to September), north-westerly winds prevail. West and south-west winds blow strong, attended often with fogs and cloudy weather, and frequently hail-storms with the S.W. wind; but the north-west winds are most violent in those months, often blowing in severe storms at North or N.N.W. for several days, with a cloudy sky and sometimes accompanied with rain. N.E. winds are less frequent than any other, and never continue long.

The first indication of a north-wester is the appearance of a mass of condensed vapour rolling over the Lion's Hill, and enveloping the signal station; also the air feels damp, and a swell sets into Table Bay; the tops of the ridges bordering the shore in the direction of Hout Bay become covered, and next, but not always, Table Mountain.

In calm weather low fogs occasionally occur, particularly in winter and autumn, the tops of the mountains and high hills being visible above the fog, which is afterwards dispersed by the heat of the sun.

TABLE BAY TO THE CAPE POINT.—The distance between the lighthouse on Green Point and the southern extremity of the Cape, taken along shore, is 11 leagues. The form of the land between is altogether variegated and irregular, and will be best understood by reference to the chart drawn up by Captain Owen, in 1822, and partially improved by Mr. Skead, in 1858-60.

From the westward the Cape peninsula appears high and rugged from Table Mountain to withing 4 miles of the Cape of Good Hope, where the mountain chain terminates at Paulusberg, which stands over the North extreme of Buffels Bay, on the West side of the peninsula. From Paulusberg to Cape Point the land is elevated and even, with the exception of two peaks at its southern extremity, which at a considerable distance make like a saddle island.

The first bay is one-third of a mile South of Green Point; it is called *Three Anchor Bay*, and is about one-eighth of a mile wide. It will shelter boats against S.E. or S.W. winds. There are two clusters of rocks, called the *Lion's Paw*, at half a mile from shore, off the Sugar Loaf or Lion's Head, 3 miles to the south-westward of the lighthouse, and to the northward of Camps Bay. Besides these there are rocks along shore, which is generally foul.

Vessels should give the shore a berth of 3 or 4 miles in proceeding to and from

Table Bay, for inside this distance the wind is baffling and light, from the close proximity of the high land.

From the western end of Table Mountain, a high serrated ridge of mountains, called the *Twelve Apostles*, extends in a S.W. by W. direction, towards Hout Bay. They present a steep precipitous face to seaward, and are terminated by a remarkable conical hill, similar in appearance to the Lion's Head, but not so high, called the Little Lion's Head, and having at its southern slope a very conspicuous white sand patch. To the southward of this, about 1¼ mile distant, rises a lofty, rugged hill, called *Suther Hill*, which is divided by a saddle ridge from *Captain Peak*, a remarkable hill of considerably less elevation, overhanging, and to the westward of, Hout Bay.

DUYKER POINT (or *Chapman's Head*), which is the westernmost point of the Cape peninsula, has some outlying dry rocks off it, and should be rounded with caution, and be given at least a berth of a mile until surveyed. Here there is no bottom at 40 fathoms at 1½ mile from shore. Green Point lights, bearing E. by N. ¾ N., clears this point at about that distance. Half a mile to the north-eastward of Duyker Point there is a dry ledge of rocks, which extend full one-third of a mile from shore.

Vulcan Rock lies W. by N. ½ N., one mile from the North point of entrance to Hout Bay, and three-quarters of a mile from the shore. It is awash at high water, and closely surrounded by sunken rocks. Between it and the shore the ground is foul, with shallow water, making it dangerous for a ship to attempt this passage until thoroughly examined. The *Abercrombie Robinson*, East Indiaman, passed inside the Vulcan in 1831, with soundings from 8 to 13 fathoms; but this was a case of necessity, the vessel having drifted close to the rocks in a fog, and it may serve as a hint to any mariner who may be placed in a like extremity.

Inside Vulcan Rock, and quite close to the shore, is *Duyker Island;* a low rock with a shoal off it. Looking down from the heights above, the shoal off Duyker Island appears to extend a considerable distance towards Vulcan Rock.

HOUT BAY.—A snug little cove, called Hout Bay, lies to the eastward of Duyker Point, at 3½ leagues to the southward of Table Bay, in lat. 34° 3½′ S. The entrance, which is open to the S.W., is 1¼ mile broad, with soundings of 19 to 12 fathoms. The upper part, to the North, is only three-quarters of a mile in extent, and has 5½, 5, 4, and 3 fathoms, fine sand; and here shelter may occasionally be found. The Dutch formerly sent ships to winter here. The coast on each side is high and rugged, particularly on the East, which is an inaccessible, steep, rocky shore. The North shore is low, marshy, and divided by a stream of fresh water. The best way in is along the eastern shore; having passed through the middle of the entrance, luff up under the West point, and there anchor. On this point, called *York Point*, are the ruins of a battery. Over York Point is *Captain Peak*, a remarkably sharp, rugged hill, perpendicular on its southern face, and connected by a ridge to N.W. with Suther Peak. On the opposite side is the remarkable peak, *Constantia Berg*, seen over high cliffs, and bearing E. ½ S. [*E.N.E.*], leads directly to the bay. Constantia Berg is about 3,200 feet in height above the level of the sea.

Hout Bay has been recommended as the coaling station of the steam vessels passing round the Cape. This has been done from the exposed character of Table Bay, with which, as an anchorage, Hout Bay contrasts very favourably. The finest garden ground in the neighbourhood of Cape Town is in the valley which runs down to the head of the bay, and a stream, the Hout River, flows through it. A tolerable carriage road is carried from the farm to Wynberg. Fresh water is abundant, but not convenient. The bay is scarcely ever visited by ships.

It is to be remarked, that at 2 miles westward of the inner bay is the Vulcan Rock, above mentioned. This rock would be dangerous if it were not visible. It lies on the meridian of Chapman Head, and three-quarters of a mile from the nearest shore. Constantia Berg, in one with the southernmost point of the peninsula of Hout Bay, leads close to the southward of the rock; keeping Constantia Berg on the bearing of E. ½ S. leads a mile to the South of it.

Slang Kop Point, or *Snake's Head* is a headland 5 miles to the south-westward of Hout Bay. The coast between forms *Chapman Bay*, a sandy shore, entirely bordered by rocks. Over the North point of this bay is a dark high peak, called Chapman Peak, useful as a mark in False Bay.

Immediately at the back of Slang Kop Point, the cliffs rise to the height of 300 or 400 feet above the sea. The point is low at the beach and rocky, with a ledge of sunken reefs extending W.N.W. to the distance of 1¼ miles. The sea breaks over this rocky ledge only in westerly winds, when there is usually a heavy swell. From Slang Kop Point to the Kromme River, a distance of 5½ miles, in a southerly direction, the coast becomes higher and rugged; thence to the Cape of Good Hope, it is elevated 300 to 400 feet above the sea, and is tolerably regular in outline.

CAPE OF GOOD HOPE.—The southernmost extremity of the Cape of Good Hope is a precipitous cliff, with a peak, the summit of which is 880 feet in height. It has been named after the Astronomer Royal, *Cape Maclear*. At a mile eastward of it is a small rock above water, about a cable's length from shore, and named *Dias Rock*. From Cape Maclear a reef extends to sea three-quarters of a mile westward, and all the coast between it and Slang Kop is bordered with rocks. The *S. W. Reef* lies W. by S. ¾ S. (*S. 42° W. true*), 1 mile from Cape Maclear.

At the southern extremity of the Cape Peninsula there are two sharp peaks, bearing S.S.E. ¼ E. and N.N.W. ¼ W., distant 1,800 yards from each other. The one to the N.W., above mentioned, is 880 feet in height, and called *Vasco de Gama*; the other is 800 feet high, and surmounted by a lighthouse.

CAPE LIGHTHOUSE.—The Cape of Good Hope Lighthouse stands on Cape Point, the southernmost extremity of the Cape Peninsula, in lat. 34° 21′ 12″ S., long. 18° 29′ 30″ E. of Greenwich. It is of iron, 30 feet high, and painted white. The light is a *revolving* white light of the first order from reflectors, which shows a bright face for the space of twelve seconds once every minute. It is visible all round the compass, except between the bearings from a ship of S.S.W. and S. ¼ E., and between S.S.E. ¼ E. and S.S.E. ¾ E., on which latter arc of 7° it is obscured by the intervention of Vasco de Gama Peak, rising 64 feet above the light. The light is elevated 816 feet above the mean level of the sea, and in clear weather should be seen from a distance of about 36 miles.

A Signal Station has been established on Cape Point close to the lighthouse. By signalizing, therefore, off Cape Point, vessels will be duly reported.

The S. W. Reef, which breaks only with a heavy swell, appears to be the outer projection of a rocky ledge, extending W. by S. ¾ S. one mile from Cape Maclear, the south-west extreme of the cape. The lighthouse bears E. ¼ N. 1¾ mile from the reef.

The Bellows, a large rock, even with the water's edge, lies with the South pitch of Cape Maclear bearing North [*N.N.W. ¼ W.*] 2 miles, and the Cape Lighthouse N.N.E. ¾ E., at nearly the same distance. From the rock, which always breaks, Muisen-berg, in the N.W. corner of False Bay, is shut in with the Cape Point, and Hang Klip, or the Peak of Cape False, bears nearly true *East*.

Anvil Rocks.—These rocks, three in number, covering an area of one tenth of a mile, have probably 14 to 18 feet water over them, except in one spot, where the south-west Anvil has only 7 feet on it at low water spring tides, Captain William Shepheard, R.N., having sounded on it in 1821. Breakers only show upon the Anvil Rocks at low water with a heavy swell, and the soundings are from 15 to 20 fathoms close around them; much care is therefore requisite when approaching their vicinity. From the outer or southern rock of the Anvil the lighthouse bears N.N.W. ¼ W. 1¾ mile, the passage between Dias Rock and the Anvil but little exceeding one mile. The Bellows Rock bears from the Anvil outer rock W. ¾ S. about 1½ mile.

The Anvil Rocks lie with the Devil's Peak (Table Bay) just open with Muisen-berg, and Paulus-berg South Hill nearly North 2½ leagues.

The channels inside the Bellows and Anvil were examined, and found to be perfectly safe for vessels of any draught, the soundings deepening regularly from 5 fathoms close to the Cape to about 16 fathoms near the Bellows, with a depth of 11 fathoms mid-channel. There is not less than 10 fathoms between Dias Rock and the Anvil, nevertheless vessels should not pass inside the Bellows and Anvil without a commanding breeze. The *Colebrook*, Indiaman, was wrecked on the Anvil Rocks in 1778.

Dias Rock bearing E.N.E. is a fairway course between the Bellows and the S.W. Reef. Dias Rock bearing N. by E. ¼ E. is a fairway course between the Bellows and the Anvil. Bellows Rock bearing S.W. by W. ¾ W. is a fairway course between Dias Rock and the Anvil.

Directions for making the Cape from the Westward.—Vessels approaching the Cape of Good Hope from the westward will, if the weather be clear, make the Cape Point light at the distance of about 36 miles, unless it should happen to bear between S.S.E. ⅛ E. and S.S.E. ¾ E., in which case it is invisible through an arc of the horizon of 7° (or a chord of 4½ miles) by the intervention of Vasco de Gama Peak. Caution is therefore necessary not to continue a course between these bearings when making the land at night, or in hazy weather, but to steer so as to cross the darkened region with as little delay as possible. By using this precaution, there is little danger to apprehend from the lights not being visible on this small sector of space.

Should it, however, happen that a ship is found to be near the land at night, and the land not visible, she must be instantly steered to the S.W. until her position is ascertained by the light being seen. If a northerly course should be adopted, under these circumstances, she might run on shore. A glance at the chart will enable this to be seen at once.

As the wind seldom, if ever, blow from the East or N.E. (*i.e.* directly off the peninsula), sailing vessels bound either for Table Bay or round the Cape of Good Hope, should ensure a weatherly position to the North or South, according to the season of the year. Vessels for Simon's Bay have been detained for many days by south-easters off the Lion's Head and Hout Bay, in consequence of their making the land too far to the northward during the summer season. The same winds would have been fair for them had they been 30 miles further South. On the other hand, a vessel bound for Table Bay in the winter season will find difficulty in making her port from any position near Cape Point during the continuance of North and N.W. winds, notwithstanding the general prevalence of a N.N.W. current from the Cape of Good Hope.

Rounding the Cape from the Eastward.—Vessels from the eastward should not bring the Cape light to bear more westerly than N.W. ⅛ W., by which they will clear all danger off Point Mudge and Cape Hangklip. A tongue of low land stretches from Cape Hangklip, on a S.W. ⅜ W. direction for nearly 1¼ miles, rendering caution necessary in passing it in hazy weather, especially if bound into Simon's Bay. If bound for Table Bay from the eastward, vessels, after rounding the Cape of Good Hope and passing Slangkop Point, should not shut in the light with that point until the lights on Green Point become visible, which will be on an E. by N. ¾ N. bearing. This course will lead about 2 miles to the westward of Vulcan Rock, which lies off the northern point of entrance to Hout Bay. A course for Table Bay may then be shaped with safety.

Rounding the Cape from the Westward.—Steam vessels usually pass between Dias Rock and the Bellows and Anvil Rocks, especially if bound into Simon's Bay. To avoid the S.W, Reef, when nearing Cape Macléar, do not bring the Bellows Rock to the southward of S.E. ⅛ S., until Dias Rock bears E. ¾ N., or until Cape Maclear is midway between Vasco de Gama Peak and a gap which separates the lighthouse from that peak; then steer so as to pass 1½ to 2 cables' lengths southward of Dias

Rock. Should a vessel unfortunately strike on any of the outlying reefs, and become in a sinking state, there is a small sandy cove between the lighthouse and Cape Maclear, in which she may be beached with greater safety than on any other part of the adjacent sea coast.

FALSE BAY.—False Bay, as shown by the chart, is formed by the peninsula of Good Hope on one side, and the land above Cape Hangklip and False Cape on the other. The distance between is 16 miles. Hangklip Cape has a steep bluff, resembling a quoin, which may be seen 8 leagues off. Without the line of the two capes is the rocky bank, on which the soundings vary from 12 to 35 fathoms; it is about 2 miles over, and the shoalest water is with the Cape Point N.W. ¾ N., and the peak of Cape Hangklip (False Cape Peak) E.S.E. Within this bank the depths are 40 and 45 fathoms; without it, 40 to 50 fathoms.

In the middle and eastern part of False Bay the ground is generally foul, and unfit for anchorage. On the western side, at 4 miles from shore, is the WHITTLE ROCK, formerly called the Trident Rock, have only 12 feet over it.

The Whittle Rock is not a single rock, but an extensive ledge of rocks, nearly a mile in circumference, covered with from 5 to 15 fathoms of water. It is steepest on the S.E. side. Another rock of 4½ fathoms, lies South (by compass), 40 fathoms, from the shoalest part of the Whittle, with 11¼ and 11 fathoms between. On the shoalest part of the Whittle, the extent of which appears to be about 6 feet in diameter, from 12 to 15 feet of water were found at low spring tides. The ebb tide sets strongly to the S.S.W., and the flood to the S.E. over the ledge.

At 80 yards South of the Whittle is another rock, on which is 4½ fathoms of water. To the N.W., at 220 yards distance, are other rocks covered to the depth of 4 and 5 fathoms. Between the two rocks the depths are 11 and 11½ fathoms. Upon these dangers the ebb tide, which is very strong, sets S. by E. and the flood E.S.E.

For the purpose of marking the exact position of the Whittle Rock, two beacons have been erected at the back of Buffel's Bay, three miles North of the Cape Lighthouse. The upper one is placed on the summit of the coast, is painted black, and can be seen as soon as the Cape is rounded. The lower beacon is painted white, on the slope of the hill, about a quarter of a mile N.N.E. of the landing place in Buffel's Bay. These beacons each consist of a spar carrying a flat board at their summits, about 22 and 26 feet high. They are in one when bearing W. by S., by compass; and are 1,700 yards apart.

There are also two other marks near to and beyond the dockyard in Simon's Bay. The top of a hill, bearing N.W. ¼ N. of the arsenal, has been whitewashed, and there is a white beacon, with staff and ball, behind the commandant's house. These last bear, when in one, N.N.W. ⅜ W., and the junction of this bearing and that of the two beacons above named mark the summit most dangerous on the Whittle Bank. There are two sand patches near the whitewashed mark similar to it, and the bottom is not visible in damp weather, so that it is not a very good mark. By keeping these marks a point open of each other, either way, you will avoid the rocks.*

The other marks for clearing the shoal are very remarkable in clear weather. The long mark is Chapman Peak, a high peaked hill over Hout Bay, just open to the right of Elsey Bay Peak N. by W. ½ W.; thwart mark, the third notch, counting to the right (on a hill situated beyond Little Smidt's Winkel Bay), on with the shoulders of the high land nearest the sea, and joining on with Simon's Bay; therefore, by keeping the three notches well open, until the peak of Elsey Bay and hill beyond seem in one, or the hill furthest off rather open to the left, will carry you between the North point of Little Smidt's Winkel Bay and the Whittle, in from 27 to 22 fathoms.

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* A beacon was placed on it in 1811 and subsequently, and a buoy was moored in 1854, but the situation was so exposed that they could not be maintained.

It would be advisable for strangers coming into Simon's Bay, after passing the Cape, to steer directly in for Paulus Berg, keeping up the western shore at any convenient distance, until they open the sand-hills in Simon's Bay. The highest sandhill appears like a road over the mountain. Just opening Block House Point, is likewise a good mark for clearing the Whittle, and for running into the bay.

A ship from the southward, on approaching False Bay, will descry the ridge of rugged mountains that terminate in Table Bay. In clear weather, the Table Mountain may be distinguished at the distance of 20 leagues. On the eastern side of False Bay, from the pitch of Cape False, northward, another ridge of mountains extends to the bottom of the bay, and thence to the north-eastward. The interval between the high lands on the two sides of the bay is low and level; and some mountains, which may be seen over it, are at a great distance up the country. Cape Hangklip, on the eastern side, so much resembles a gun-quoin, that it cannot be mistaken.

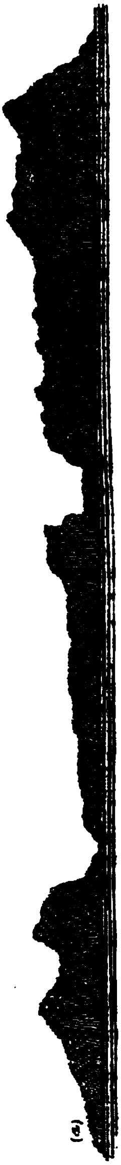
On coming into the bay from the westward, with a N.W. wind, a ship may pass to the southward and eastward of the Bellows and Anvil, at the distance of 2 miles, or according to circumstances. From abreast of the Bellows, at 2 or 3 miles, haul up no higher than E.S.E. or E. by S., until you have run 5 or 6 miles in this direction, whence you may steer to the E.N.E. and N.E. till the Cape bears W.N.W., and you will be clear of the sunken rocks. In advancing thus, you may always gain a proper anchoring ground, in case of a calm, or an unforeseen shifting of the wind.

On the western shore of False Bay, at 2 miles to the northward of Cape Point, is Buffel's Bay, a small indentation in the coast line, marked by a white sand patch. The depth of water is 4 or 5 fathoms, near the shore, and in a N.W. breeze a vessel may anchor off it in 8 to 10 fathoms; if unable to beat to windward, this is preferable to going to sea. There is a fishing establishment and a landing place in the bay.

Ships may anchor in 26 fathoms, sandy bottom, with Cape Point S. ¾ E. and Paulus Berg N. ¾ E., distant from shore 1¼ miles. Here it will be smooth in a north-wester, and if a south-easter comes on, you will have room to weigh, cast, and run up to Simon's Bay. Ships have ridden out strong south-easters at anchor off Buffels Bay, but with considerable risk. Between Buffels Bay and Smithwinkle Bay, 3¼ miles further North, the shore is overlooked by four sharp peaks. Off both horns of Smithwinkle Bay, rocks, some of which are above water, project one-third of a mile from shore.

Miller Point (formerly known as Smithwinkle Point), is about 7 miles from Cape Point, and 4 from Roman Rock Lighthouse. It is the most prominent point, and under the highest land, between the Cape and Simon's Bay. Miller Point runs off to a ledge of dry rocks, beyond which there is an isolated rock one cable to the south-eastward. This outer rock, which is about 9 feet above high-water mark, has 11 fathoms water close outside it, and may, therefore, be passed as close as convenient. Inside this rock the soundings are 12 fathoms until within a few yards of the point.

A mile to the northward of Miller Point is *Rockland Point*, which also has dry rocks off it, with deep water about them. This point has not been much examined, and had better be given a berth of half a mile. Next to Rockland Point, and distant from it 1¼ miles, comes Oatland Point, with a few rocks off it. Here the coast may be approached to one-third of a mile from shore.



Appearance of the Cape of Good Hope (a). Cape Point N. by W. ½ W. distant 10 leagues.

From Smithwinkle Bay to Rockland Point the coast is lofty, the hills rising to a height of 2,200 feet, almost abruptly from the sea. To the northward of Rockland the hills recede a little from the sea. The depth of water along this coast, at the distance of a mile, appears to be from 20 to 25 fathoms.

Noah's Ark is situated S.E. ¾ E., 5 cables from Blockhouse Point, the southern point of Simon's Bay; it is 3 cables from shore, and about a mile to the northward of Oatland Point. Noah's Ark is a flat-topped rock, about 100 feet long by 30 feet high. From it, in a N.N.W. direction, to the distance of 3½ cables, the ground is shallow and foul, having on it the Nimrod Rock, in 8 feet water, and terminating with the *Phænix Rock*, which has but 3 feet water over it. This latter danger is marked by a beacon, lying N.N.W. half a cable from it, with the word "Rock" painted on its flag. The water is deep close round Noah's Ark, save on the north-east side, where, at 30 yards off, there are 2½ fathoms; but it may be approached within a ship's length. There is a passage inside Noah's Ark, but it should on no account be attempted.

Maidstone Rock, with 22 feet on it at low water springs, bears S.E. ½ E. 2 cables from the S.W. end of Noah's Ark, and rises to a sharp peak, the summit of which is so small that it is difficult to keep the lead on it.

The cross bearings for Maidstone Rock are the south-west end of Noah's Ark on with the North corner of Mr. Osmond's (Mount Curtis) Garden-wall, N.W. ½ W.; a remarkable round rock on the beach on with Anderson's Cottage; also the Roman Rocks, a sail's breadth open of the foot of Muysen Berg. This rock was discovered by a fishing boat of H.M.S. *Maidstone* in February, 1830.

SIMON'S BAY.—Eleven miles to the northward of the Cape Point, within False Bay, and at the foot of the highest mountain on the coast, lies Simon's Bay, into which you may put, in that season when Table Bay is unsafe, that is to say, in the months of May, June, July, and August, or when other circumstances render it necessary. Though this place is not more than a large cove, sheltered only from the winds between the North and S.E. coming by the West, yet those of the other quarters, which come from the bottom of the bay, or from the mountains bordering the coast, never blow there so strong as to endanger the shipping; so that it may be looked upon as a safe retreat, wherein you may lie sheltered from all winds; besides, at Simon's Bay, you meet with all the supplies which a vessel may need after a long run, or in case of damage to her rigging. Here are magazines of marine stores: and victualling, with other necessaries, are procured from the Cape Town, which is not above 6 leagues off. You may wood and water here as readily as in any port of Europe; and even, in case of necessity, heave down by a hulk. But there is now a patent slip fit for vessels of 1,500 to 2,000 tons, which can be lightened to a draught of 16 feet.

Supplies are procured from this place, and if more are required they can be had from Cape Town, the road from which has been much improved. The water is excellent. For men-of-war it is brought alongside in a tank-vessel, containing about 70 tons. There is a smaller tank-vessel for merchant ships, containing about 5 tons, but the dockyard tank is frequently lent to water merchant ships on application. Fish is abundant in the bay, and the beaches are good for hauling the seine.*

The country being mountainous, little or nothing is produced here, and there are few houses, exclusive of the public buildings; these compose the arsenal and dockyard; one of them has a clock.

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* *Caution.*—There is a fish in Simon's Bay commonly called toad-fish. It is about six inches long: back dark, with deep black stripes; belly white, with faint yellow patches; it swims near the surface, and is a constant attendant on lines employed fishing. When taken from the water it puffs out considerably. Should any portion of the fish be eaten, *death* ensues in a few minutes.—*Lieut. Jamieson.*

There is an electric telegraph to Cape Town, thence to Paarl, Stellenbosch, and Wellington.

TIME SIGNAL.—A circular disc, attached to a lever arm, working on a mast, has been established close to Simon's Town telegraph office, for the purpose of giving to vessels in Simon's Bay the instant of 1 P.M. Cape Observatory mean time. At 55 minutes past noon the disc is raised to a right angle with the mast, and it falls at the instant of 1 P.M. The latitude of the Time Signal is 34° 11′ 30″ S., long. $1^h\ 13^m\ 43.8^s$ East of Greenwich, and it is 11.7 seconds West of the Cape Observatory.

Owing to the imperfect insulation of the telegraph wire, the Simon's Bay time-ball sometimes fails. On these occasions the ball is kept up until two o'clock, and then slowly lowered.

Iron and other vessels desirous of testing their compasses, to ascertain the local attraction, will find it convenient to use a conspicuous sharp peak near Cape Hangklip, instead of having a person on shore taking simultaneous observations. The true bearing of this peak from the anchorage is S. 71° 0′ 42″ E.; and as the peak is 22 miles distant, the bearing will not be materially affected by the change of position of the vessel in any part of the anchorage.—*Sir Thos. Maclear.*

ROMAN ROCKS.—These are a cluster, one of which is out of water, the rest awash, surrounded by foul rocky ground, occupying an extent of three-tenths of a mile radius from the centre one.

LIGHTHOUSE.—A light tower has recently been completed on these rocks; it is circular, of iron, and 48 feet high; the lower half is painted black, the upper half white. It stands N.E. by E. three-quarters of a mile from Noah's Ark, and E, by S. 1¾ mile from the Dockyard clock. It exhibits a *revolving* white light which shows a bright face for the space of 12 seconds every *half minute*. It is placed 54 feet above the mean level of the sea, and in clear weather should be seen at a distance of 12 miles. It is from the designs of Mr. Alex. Gordon. Being in a very exposed situation, it has been recently said to be unsafe.

Castor Rock is detached from the Roman Rocks cluster, and lies N.N.E. ¾ E. 2¾ cables from the light tower. It has only 15 feet water on it; its position is marked by a beacon, with a flag attached, having the word "Rock," painted on it. Between the rock and the lighthouse there are patches of 10 and 24 feet water.

Seal Island is a low rocky islet, half a mile in length, North and South, and two tenths of a mile in width. It lies E. ½ S. 6½ miles from the Roman Rocks Lighthouse. It is surrounded by sunken rocks, upon which the sea usually breaks.

Landing is difficult, except in very smooth water. This island abounds in guano, and is the resort of penguins, whose eggs may be collected in considerable numbers at the proper season.

York Shoal.—The nearest part of this shoal lies S. by E. three-quarters of a mile from Seal Island. It is a large rocky patch with from 11 feet to 6 fathoms on it, extending 1½ mile East and West, by 1 mile North and South. The sea only breaks on it in rough weather.

The Eastern Shoal is situated S.E. ½ E. about 3½ miles from the centre of Seal Island. It is nearly dry in places at low water, and appears to be extensive: it breaks very heavily after N.W. gales.

The ground in the vicinity of the Eastern Shoal, Seal Island, and the York Shoal has not yet been thoroughly examined, but as they lie out of the usual track of vessels, the want of soundings has not been of so much importance.

Another shoal, bearing S.E. by E. from the Eastern Shoal, is said to exist, and to break sometimes. Lieutenant Adeane, of H.M.S. *Brisk*, when crossing from Simon's Bay to the Strand in a boat in 1861, observed a break about corresponding to this position.

DIRECTIONS.—*Vessels from the westward* bound for Simon's Bay, after rounding the Cape of Good Hope, and being past the Bellows Rock at half a mile distance, keep on to the East till Vasco de Gama Peak comes open to the eastward of the Lighthouse Hill, or until Elsey Peak comes open of Miller Point N. ½ E., when you will be to the eastward of the Anvil. Then, having brought the southern end of the lofty Zwartkop range (which is over the northern side of Smithwinkle Bay), to bear N.W. by W. ¼ W., keep the light on Cape Point between S.S.W. ¾ W. and S.W. ⅜ W., until the Roman Rock Light bears between N. and N. by W. ½ W., then you may haul towards it. These limits leave the rocks off Miller Point on the one hand, and the Whittle Rock on the other, half a mile distant.

The Roman Rock Light should not be brought at any time to bear to the eastward of North, on account of the rocks off the western shore.

The following directions are also recommended :—After rounding the Cape, shape a course to pass Miller Point at from one to 2 miles distance, taking care not to bring the Cape Lighthouse to the westward of S.W. ⅜ W., or the Roman Rock Lighthouse to the westward of N. by W. ½ W., until past the Whittle. You may then shape your course to round Noah's Ark at a cable's distance or more, taking care (if a large ship) to open Blockhouse Point to the northward of Noah's Ark before getting within a quarter of a mile of the latter, so as to pass outside Maidstone Rock. When past Noah's Ark, do not bring it to the eastward of S. by E. until the blockhouse bears W. by S.

If the vessel is to work up to the eastward of the Whittle, the Roman Rock Light should not be brought to the N. of N.N.W. ½ W., in order to avoid that rock; nor to the westward of N.W. by W. ½ W., so as to give a sufficient berth to Seal Island and the shoal near it. But by whichever of those channels a ship approaches, short tacks should be made until certain of being within 5 miles of the light.

With a leading wind the Roman Rock Light may be brought to bear N. by W., which will clear the Whittle; and that course should be continued till within a mile of the light. The light must then be well opened on the port bow, so as to round it at not less than half a mile distance. When the light has been brought to bear S.S.W., steer in West for the anchorage, and bring up in 14 to 10 fathoms, according to the weather.

Vessels from the eastward should not bring the light to bear more westerly than N.W. ½ W., by which they will clear all danger off Cape Hangklip. A tongue of low land stretches from this cape in a S.W. ⅜ W. direction for 4¼ miles, rendering caution necessary in passing Hangklip in hazy weather, especially if bound into Simon's Bay. If bound for Table Bay from the eastward. vessels, after rounding the Cape of Good Hope and passing Slang Kop Point, should not shut in the light with that point until the lights on Green Point become visible, which will be on an E. by N. ¾ N. bearing. This course will lead about 2 miles to the westward of the Vulcan Rock, which lies off the northern point of entrance to Hout Bay; a course for Table Bay may then be shaped with safety.

The common channel for ships entering Simon's Bay is between Noah's Ark and the Roman Rocks, a width of seven-tenths of a mile; but if the wind be N.W., the passage East and North of the Roman Rocks must be taken, as it affords better working space.

Ships bound for Simon's Bay have frequently mistaken Muizenberg, a mountain 2,000 feet high, which rises from the shore at the north-west corner of False Bay, for the high hill over the South side of Simon's Bay, and have, in consequence, been stranded on Muizenberg beach, the lowness of which, coupled with the dazzling colour of the sand of which it is composed, causing it to be of similar appearance to the surrounding water. To prevent this mistake, it must be borne in mind that the first or westernmost patch of white sand, extending high up the hills, is situated to the northward of Simon's Bay. The sand patches, four in number, are conspicuous even at night, and in steering for Simon's Bay they will be ahead, and on the *starboard* bow; whereas, if the vessel is steering for Muizenberg Beach, they will all be on the port bow. These remarks may appear unnecessary with the light on the

Roman Rocks, but, notwithstanding this, several ships have made the mistake; one ran on shore, and several others were only saved by anchoring close to the beach, from which they were rescued by assistance from Simon's Bay.

It should be remembered that, with the exception of the sand patch over Buffel's Bay, these are the only sand patches on the West side of False Bay.

Observe, also, that the soundings westward of Seal Island for 1¼ mile are 15 and 15½ fathoms, rock, gravel, and bits of shells; and from thence to Elsey Bay 14 and 14½ fathoms, clean white sand (the sand is not so white and clean in any other part of the bay); therefore, in thick weather, should you get so far into the bay as to have 14 fathoms clean white sand, or 15 fathoms, rock, gravel, and bits of shells, you should immediately steer to the westward, or anchor according to circumstances.

If apprehensive of being near the Whittle in thick weather, it may be of service to know that on its south-east, South, and south-west sides, at half a mile distance, the soundings are 22 and 23 fathoms, large bits of whitish shell without any sand: the same bottom, in 24 and 25 fathoms, will be found in some other places in the vicinity of this rock, but in no other part of the bay are there such soundings.

At Night.—Rounding the Cape when bound to Simon's Bay, it is not easy to judge your distance so as to give the Bellows and Anvil a good berth. Perhaps the best way is to observe the angle of elevation of the light above the horizon, and so calculate your distance or take it from the traverse table, the light being 816 feet above the sea.

When to the eastward and northward of the Anvil, shape a course to the northward so as to bring the Cape Light to bear S.W. ¼ S., and run from it on that bearing until the Roman Rock Light bears N, ¾ W., then steer N. ¾ W., altering course a little to the eastward on approaching within a couple of miles of the Roman Rock Light, so as to open it on the port bow and round it at not less than one-third of a mile distance. When the light bears S.S.W., steer in West for the anchorage, and bring up in 14 to 10 fathoms.

Unless thoroughly acquainted with the navigation and favoured with moonlight ships, at night, should always pass to the eastward and northward of the Roman Rocks.

Vessels coming inside the Whittle should keep the light on Cape Point, between S.S.W. ¾ W. and S.W. ⅜ W., until the Roman Rock Light bears between North and N. by W. ½ W., when they may haul towards it. These limits leave the rocks off Miller Point, on the one hand, and the Whittle Bank, on the other, half a mile distant.

Caution is necessary in misty weather against the possibility of mistaking the light on the Roman Rocks for the light on Cape Point, as they are both revolving, and only 10 miles apart. The distinction consists in the difference of interval of revolution, the light on Cape Point showing its bright face every minute, and the light on Roman Rocks every half minute.

Eastward of the Whittle.—Observe that the Whittle is nearly in a straight line between Hangklip and Simon's Bay. Running from Simon's Bay do not bring the Cape Light to the southward of W.S.W, until the Roman Rock Light is between the bearings of N.N.W. ½ W. and N.W. by W. ½ W., between which bearings you are clear of the Whittle on the one hand, and the York Shoal on the other. If working in, you should make short tacks between the above-bearings of the Roman Rock Light until certain of being within 5 miles of it.

By day, Chapman Peak touching the western edge of the sand in Fish-hook Bay leads two-thirds of a mile to the eastward of the Whittle.

Vessels bound to the eastward should leave the bay when north-westers begin to blow; if bound westward in the winter season, they ought to remain till these winds are on the decline, and get under way when they shift to West, as it is probable they will veer from West to S.W., South and S.E., which will be favourable for doubling the Cape.

Running for Simon's Bay in a South-easter.—It is not advisable in a strong south-easter to run for Simon's Bay at night, for the gusts of wind are violent, and there is a risk in bringing up; whereas, if you wait off the cape under low sail till daylight, you will get into Simon's Bay by 7 or 8 A.M. without risk.

It has been recommended, when entering Simon's Bay, in a heavy south-easter, that ships should pass outside the Roman Rocks, so as to have more room for rounding to; but as by this means you come in the last mile with a beam wind, there is a risk of sails or spars unless close reefed. It is perhaps better to come in between the Roman Rocks and Noah's Ark, shortening sail so as to have all furled when abreast of Noah's Ark, and to round to under the spanker only. The sheet cable should invariably be bent, and the anchor clear, when entering False Bay in a south-easter.

In Simon's Bay, 13 or 14 sail of ships may lie moored in safety. The new moon makes high water here at $2^h 44^m$. The tide seldom rises more than 3 feet, except after a storm, or some other circumstance. There is no current to be perceived in the bay; the soundings are also regular, with a clear sandy bottom.

If the barometer stands at 30.2 to 30.3 and falls suddenly to 30.0 or 29.95, in nine cases out of ten it will blow a strong S.S.E. gale. The Muisenberg capped with white cloud is the precursor of a south-east wind; and if the Hottentot Holland range on the East side of False Bay is also capped, the south-easter will probably be violent and of long continuance. When Simon's Berg has a misty cloud on its summit, rain may be expected within an hour or two.

Elsey Bay, 1¼ mile North of Simon's Bay, is merely a slight indentation of the coast without any shelter. Its North point is *Point Elsey*, high and rocky, with *Elsey Peak*, 1,200 feet high, at the back of it. *Fish Hook Bay*, another slender bay, without shelter, lies to the North of this. Adjoining is *Kalk Bay*, a whaling and fishing station, with the only good landing on this shore; which may become hereafter of importance in the communication with Cape Town.

The *Muizenberg*, a mountain, about 2,000 feet high, lies to the northward of Fish Hook Bay, and in the N.W. corner of False Bay. To the eastward of its base the northern shores of the bay are sandy and low, continuing so for 18 miles. The shore has generally a very heavy sea breaking on it, and in some parts there are rocks a short distance from the shore.

The whole of the land at the bottom of False Bay is very low, and consists of sandy downs. At the feet of the high lands, East and West of the bay, are some marshes and lakes, fed by numerous streams which fall down their slopes. The two principal of these rivers are the *Grootezeekoe*, which forms a lake, one arm of which passes to the village of Constantia. To the East the *Stellenbosch* passes the village of the same name, lying inland. The *Strand*, a fishing station and boat harbour, is in the N.E. corner of False Bay.

Gordon's Bay, in the N.E. corner of False Bay, 2¼ miles South of the Strand, affords good shelter against all winds from North to S.W. by the East, but it is exposed to those from N.W., which are violent in winter. The North side of the bay is sandy, and here is a small beach in front of some houses, where you may land, but it is very much exposed.

PAULUS BERG, a conical peak, 1,200 feet high, forming part of the chain called the Bergen-van-Drakenstein, lies to the East of the bay. From the South point of Gordon's Bay, the East side of False Bay consists of a bold rocky coast, surmounted by high lands. It forms a slender exposed bay, *Colebrook Bay*, with a sandy beach; and at 2¼ miles from Cape Hangklip is *Pringle Bay*, a mile wide, rocky, unfrequented, and without resources. A rivulet falls into its N.E. angle. To the S.E. of the bay rises Hangklip Peak.

CAPE HANGKLIP, or FALSE CAPE.—The latter gives the name to False Bay; the former name is derived from a quoin-shaped hill, 1,460 feet high, nearly a mile and a half N.E. from its extremity, which overhanging its base when viewed from the southward, is called *Hangklip*, or the hanging rock. It is the eastern limit of False Bay, and makes like an island when approached from the southward. A conspicuous sand patch extends halfway up its south-eastern side. Cape Hangklip is a low projection, on which the sea always beats heavily, and has some rocks extending from it to the W.S.W. for one-third of a mile and upwards, and therefore should not be made too free with.

At two miles to the eastward of Cape Hangklip there is another low rocky projection, with numerous outlying rocks to the distance of one quarter of a mile, and from this the rocky coast extends easterly for 8 miles to the *Palmiet River*, a rapid stream at times, but the entrance of which is always blocked with sand. At three-quarters of a mile eastward of this is a small cove, where boats may land at high water in fine weather.

At the back of this coast is a chain of mountains, which commences at 5 miles from Cape Hangklip, in two peaks of 2,780 feet in height, and extends far to the eastward.

Sandown Bay is merely a sandy beach, nearly straight, which extends for 6 miles in a S.E. direction to Point Mudge, in the middle of which the *River Bot* finds its way through the strand to the sea. At the southern end of this beach is a fishing station, where the boat from the unfortunate *Birkenhead* landed after the wreck. There is better landing in *D'Urban Cove*, in S.E. winds and fine weather, at the extremity of Point Mudge, formed by many sunken rocks and masses of kelp.

Point Mudge is low and rocky, and must not be passed too closely, as dangerous rocks and shoal water extend for half a mile to the S.W. of it. Like other capes in this vicinity, the high land is at some distance within it, which should be considered at night time. *Onrust Berg*, the western end of the coast range, is a square bluff of 1,575 feet elevation, with a conspicuous pile on its summit 1¾ miles from the extremity of the cape.

WALKER BAY.—From Point Mudge the coast takes a south-east direction for 4¼ miles to *Shell-lime Point*, then forms Walker Bay, which has Point Danger at its southern extreme. The bay is remarkable for the immense tracts of sand and high sand-hills at its head, which are visible at a long distance at sea, and give a distinctive character to the land, which would have been aptly expressed by the name Sandown. A long heavy swell rolls into the bay, and the water is deep within one or two miles of the shore.

Kleine River, in the northern bight of Walker Bay, is a stream of considerable size inland, but its mouth is choked with sand.

Stanford Cove, a small rocky inlet, similar to D'Urban Cove, before described, also affords landing in E. and S.E. winds. It is in the rocky southern shore of Walker Bay, 5 miles N.E. of Point Danger. There are several rocky patches off it, which, with the heavy swell, render it less available than Hydra Bay. There is plenty of good water near Stanford Cove.

Hydra Bay, two miles to the N.E. of Point Danger, is the best anchorage under that point, as further in the swell is heavier. The bay is easily distinguished by a sand patch which marks the face of the hillock over it.

If coming in from the S.W. to anchor in Hydra Bay, the pitch of Point Danger should not be approached nearer than 2 or 3 miles; the bluff hill of Point Mudge may be steered for until the sand patch is well open, when the rocky spit projecting from Danger Point will be cleared. Then haul up for the bay, and anchor in 12 or 14 fathoms, about three-quarters of a mile from the shore, taking care to give a 2-fathoms rocky patch in the centre of the bay, upon which the sea often breaks, a wide berth.

To clear this rocky patch, keep the low part of Danger Point open of the points of coast which are between it and the anchorage. H.M.S. *Hydra* anchored in 12 fathoms, with Duinfonteinberg pile bearing E.S.E., southerly; extreme of Danger Point S.W. by W. ½ W., and the sand patch in Hydra Bay S.S.E. ½ E., southerly.

TIDES.—The rise of the tide (about 5 feet) and the establishment ($2^h\,44^m$) at Simon's Bay, Dyer Island, and Struys Bay, are very nearly the same, and the stream of tide along the whole coast between Cape Hangklip and Struys Bay is inconsiderable and uncertain.

DANGER POINT, S.S.E. ½ E., nearly 28 miles from Cape Hangklip, was formerly called Bluff Point, but very improperly, as the high land, as has been before mentioned, is four miles and a half within it. It is a tongue of low hummock land, projecting into the sea about 4½ miles from the base of Duinfonteinberg, which is 1,130 feet high, and a conspicuous and remarkable bluff hill from every point of view at sea. This point affords shelter from the S.E. gales of summer to ships of any size. The soundings are irregular off Danger Point. If approaching it at night, do not go into less than 35 or 40 fathoms; that is 5 or 6 miles off the point.

BIRKENHEAD ROCK.—Several detached sunken rocks are met with off this part of the coast, the most dangerous of which lies about a mile from the pitch of the point, with 12 or 14 feet water on it.* There is a clear channel between the Birkenhead Rock and the reef of sunken rocks stretching out from the western angle of Point Danger. The sea breaks with great violence on the rock, but often at intervals of about a quarter of an hour.

In the N.W. corner of the bay, formed on the south-eastern side of Point Danger, is the mouth of the *Uilkraal River*, a small stream, checked at its junction with the sea by sand.

DYER ISLAND, S.E. by S. 6½ miles from Point Danger, is a low rocky islet visible but a short distance at sea. In its centre and higher parts a little spinach grows, and it is the abode of numerous rabbits (similar to the English), gulls, cormorants, pelicans, and penguins. *Geyser Island*, one-quarter of a mile S.E. by S. of Dyer Island, is smaller and somewhat higher, and the resort, in certain seasons, of seals, for killing which there was formerly a permanent establishment on Dyer Island. These Islands, together with the numerous rocks, extending nearly 1½ mile to the westward of them, form a natural breakwater, under which vessels of any size may find shelter in S. and S.E. gales.

Landing is not good, and at times impracticable. The best is near a small staff and shed, the marks of a disused sealing station.

ANCHORAGE.—Dyer and Geyser Islands, being low and white, are made out with difficulty when seen against the sand-hills on the adjacent coast. In approaching them from the southward, the danger to be avoided is the reef of sunken rocks stretching to the westward from the islands, upon which several of H.M. ships have struck, and which is most dangerous in fine weather, when the sea does not break. It will be cleared by keeping the entrance of Point Danger on with the valley in the high land near Cape Hangklip, until the highest part of Geyser Island is in line with the Quoin. Then haul up for Duinfonteinberg (the bluff hill behind Point Danger), and when the extreme of Dyer Island is in line with the Quoin, steer for the Quoin, and anchor in 10 fathoms, with the extremes of Dyer Island bearing S.S.E. ¼ E. and S.S.W. ¼ W., southerly; Duinfonteinberg Pile N. by E.; extreme of Danger Point N.W. ¾ N.; and Gunner's Quoin Pile S.E. The bottom is sand, and the holding ground good, but the reef affords no shelter from S.W. winds, and the anchorage is safe only as long as the wind is not to the westward of S.S.W.

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* This rock is memorable as the scene of the terrible wreck of H.M. steam troop ship *Birkenhead*, at 2 a.m. of February 26th, 1852. She left England with troops for the Caffre war, then vigorously carried on, with 630 souls on board, and reached Simon's Bay Feb. 23rd, after a passage of 47 days. Leaving this anchorage in the evening, she struck the following morning on the rocks off Point Danger, while going full speed, and in less than twenty minutes not a particle of her was visible. The vessel instantly broke up; and 438 of the officers, seamen, soldiers, and boys, out of the 630 persons on board, perished.—See "United Service Gazette," April, 1852.

There is a narrow channel, with a depth of 3 fathoms between the East end of Dyer Island and the rock above water inshore, which a small vessel might find practicable under favourable circumstances, but it cannot be recommended, and the sea breaks quite across it in S.E. or southerly winds.

Coast.—From Danger Point to *Quoin Point*, a distance of 10 miles S.E. by S., the coast is low near the sea, and backed by bare rugged hills of moderate elevation one of which, called *False Quoin*, from its shape, is 888 feet high, and about half way between Danger and Quoin Points. A long heavy swell constantly breaks on the shore, which is inaccessible.

About half way between Dyer Island and Quoin Point are two rocky patches, 1¼ miles off shore, upon which the least water found was 4 fathoms. The sea breaks upon them when there is any swell.

GUNNER'S QUOIN (called by the Dutch *Buffeljagtberg*) is a conspicuous bluff hill, 997 feet in height, named from its resemblance to a quoin, which, however, it does not bear when viewed from the westward.

Quoin Point is a square projection of hummocky land, from the base of the Gunners Quoin, and is 3¼ miles from it. It is fronted by sunken rocks to the distance of 1¼ mile from the shore, and is distinguished when seen from the southward by two sand-hills near its extremity.

From Quoin Point to Cape Agulhas, S.E. ¼ E. 18 miles, the coast is low and sandy except abreast of the flat-topped range of *Zoet Anysberg* (850 feet), where the shore is steep and rocky. The whole of it is exposed to the full force of the ocean swell, and landing upon it is impossible. The soundings are shoaler along this part of the coast than they are off, and to the westward of, the Quoin.

H.M.S. *Hydra* found tolerable shelter and smooth water, in a strong N.W. wind, at anchor under the lee of the reefs to the eastward of Quoin Point, and it is possible that a small vessel might find the same close under the extreme of the point, between which and the reefs there appears to be a clear but narrow passage. But these reefs extend 1¼ mile off shore to the East of the point.

CAPE AGULHAS, the southernmost point of the African continent, lies at the distance of about 28 leagues S.E. ¾ S. [*E.S.E. ¼ E.*] from the Cape Point of Good Hope.

The land of Agulhas is even, having no high land within it for several miles in any direction; but to the *W.N.W. true*, at the distance of about 5 leagues from the cape, is the hill near the sea, before mentioned, which appears insulated, and is called, from its peculiar form or appearance from the eastward, the *Gunners Quoin*. This may be seen 9 or 10 leagues off. It is always to be recollected, that the low land of the coast projects much further to the South than any of the high land in the vicinity. The edge of the shore is uniformly rocky to a great distance, both eastward and westward of Cape Agulhas.*

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* The Cape was called by its first discoverers, the Portuguese, *Cabo das Agulhas* (pronounced Agulias), which means *Needle's Cape*; and was so called, from the compass having *no variation* here, on the first discovery of the Cape. Lagullas, Aguilhas, or Lagullus, are corruptions of the original name.

Those from the eastward must take care in the summer months, when the S.E. winds prevail, not to fall to leeward; for it will be very difficult to gain False Bay, if a ship first makes the cape land when to the westward of it, during a strong S.E. wind. At times ships from India, bound into Table Bay, have been obliged to bear away for St. Helena, in consequence of passing the cape in the night, and being unable to beat against a strong easterly wind and leeward current.

Cape Agulhas is defined to be the rocky projection from the S.E. corner of the Agulhas Promontory, the centre of which promontory is about three-fourths of a mile westward of the projection, and about 200 yards more southerly, being the most southern part of Africa.

Description of the land.—The features of the land about Agulhas distinguish it from the neighbouring headlands. A ridge-shaped undulating clump, rising from the flat ground, is separated into four ridge-shaped hills by irregular ravines running nearly true East and West.

Viewed at a distance from the seaward, easterly or westerly, the North and South elevations being seen nearly end on resemble two oblong hummocks; but the former, extending more easterly, appears the highest as seen from the eastward. Viewed at a distance from the southward, the South ridge masks the others, save at their East end. The highest part of the South ridge is 455 feet above the level of the sea, and one mile from it. On the first undulation from the shore, which is about 55 feet above the level of the sea, nearly true South of the highest point before mentioned, the lighthouse is built.

LIGHTHOUSE.—This important structure was first illuminated on March 1, 1849. It is a fine building, consisting of a central tower, about 70 feet high, with a smaller one on each side, connected by curtain walls. The tower is painted red and white bands. It stands on an elevation of 61 feet above the main sea level, and bears N. 30° W. mag., 520 yards distant from the extreme point of Cape Agulhas. Lat. of the light 34° 49′ 45·7″, long. 20° 0′ 40″; and 1^h 20^m 2·67^s E. of Greenwich; or 1° 31′ 55″, or 0^h 6^m 7·67^s E. of the Cape Observatory. The position may be considered to be an exact geographical point.

The light is a *fixed white light*, at 128 feet above the sea, and can be seen in any direction seaward between E. and N.W. by W. from the tower, at the distance of 6 leagues from a deck 15 feet high.

The coasts of the Cape Colony to the eastward are described in our DIRECTORY FOR THE INDIAN OCEAN, 1865, to which the reader is referred.

APPENDIX.

HYGIENIC RULES FOR THE PRESERVATION OF HEALTH IN WESTERN AFRICA AND OTHER TROPICAL CLIMATES.

BY WILLIAM F. DANIELL, M.D., F.R.G.S., Staff Surgeon.

(A large proportion of the coasts described in the preceding pages is comprised within the tropics, where climate has so marked an effect in subduing the health and energies of those natives of more temperate regions, who may be compelled to visit or reside there. These climatorial influences consequently greatly interfere with the development of commerce and the civilization of the natives of the countries these coasts limit; regions unsurpassed in their fertility and productiveness. The African coasts contrast very unfavourably with those of Brasil in respect of their salubrity, owing to the influences of the prevailing easterly wind blowing over the continent, and thus bearing malaria and deleterious hygrometric changes in the first instance, and over the genial ocean in the second.

With these remarks we would direct special attention to the ensuing directions for the preservation of health in these regions. The well known talents and skill of their author, who has favoured us with them, and whose works have been frequently quoted in the previous descriptions, will be an assurance of their efficiency and importance.—ED.)

The preservation of health under ordinary circumstances is a subject of serious consideration, but in unhealthy climates it becomes one of paramount importance. Diseases of tropical countries differ widely from those common to colder regions, and in general have a less fortunate issue. Engendered from a multiplicity of sources, they often assume an asthenic or typhoid form, run a sharp and rapid career, and, if unchecked, cease with a melancholy termination. In the alluvial and swampy districts of Western Africa, and even in the more elevated table lands, the maladies from which Europeans suffer are those generated by what has been termed *malaria*, an endemic or epidemic poison, resulting from a combination of various local and atmospheric influences. In many instances, when concentrated, they induce that morbid condition of the body which only ends with life; and as the diseases therefore proceeding from these causes are not unfrequently developed in an aggravated form, and a low insidious type, an active and energetic mode of treatment becomes immediately requisite. The climatorial agencies peculiar to the maritime countries of equinoctial Africa, have been considered to be more pernicious and unhealthy than those emanating from other portions of the same continent; their nature and predominant characteristics have not however been satisfactorily determined; they are nevertheless sufficiently deleterious to create an enormous sacrifice of human life, and, as experience demonstrates, demand a larger amount of skill and knowledge, to combat their depressing action on the frame, than similar agencies elsewhere within the tropics. The necessity for unacclimated persons adopting certain prophylactic measures, as might enable them to withstand the attacks of the local affections, and modify their severity, is too obviously enforced, to require comment. There can be little doubt that by an efficient and judicious code of sanitary regulations, a tolerable state of health may be maintained in several of those pestilential localities for a considerable period; but at the same time it must be distinctly understood, that though such regulations may prove unable to avert the accession of sickness, they will go far towards restricting its violence, and when the ordinary febrile and dysenteric diseases are somewhat divested of their more formidable symptoms, they will have lost much of that intractable character, so difficult of management, and consequently will be rendered more amenable to the remedial effects of medicine.

The seasons on the coast of Africa may be divided into two, viz., rainy and dry, the former of which is the most unhealthy for white residents and voyagers. The African climate derives its peculiar consitution from excessive atmospheric humidity, conjoined with an elevated temperature, and the constant exhalation of local miasms, more or less influenced in their noxious prevalence and origin by various electric laws, at present unknown and unappreciated. The following rules have chiefly guided the author, during a seventeen years' tour of service in most of the countries of Western Africa, and he has hitherto found them sufficiently effective to aid in the maintenance of good health, and the reduction probably of an otherwise heavy mortality.

1. The dress should be usually constituted of flannel, cotton, or such woollen fabrics as are best adapted for resisting the alternating vicissitudes of heat and cold. Flannel should be invariably worn next the skin, as during the rains it reduces the chilling influence of an active humidity, and in the dry and hot season absorbs the copious perspiration then exhaled, and by the moistened medium it affords, prevents direct evaporation from the cutaneous surface, a result always to be dreaded in tropical regions. In the cold and rainy season, shirts, trowsers, and in fact the entire dress, if composed of flannel, would be found to be the best means for resisting the injurious action of a humid atmosphere or heavy showers, and their concomitant sequelæ, rheumatism and fever. The head cannot be too carefully protected from a torrid sun, and thick felt caps, or straw hats well lined, will prove most serviceable. In their selection those of a black colour should be avoided, as they absorb a greater degree of heat. The feet must also be kept well dried, and woollen socks are preferable to cotton, if they do not produce inconvenience.

2. As personal cleanliness is in every country essentially conducive to the preservation of health, it cannot but otherwise become in tropical climates one of the most important adjuncts, to other measures deemed imperatively necessary. Ablutions of the body should at least occur daily, whenever the skin is not too much heated, and suitable opportunities offer. With reference to cold baths, some precautions are requisite, and as a general rule they ought never to be used by debilitated persons, convalescents, or others subject to special visceral diseases, or whenever the body is bathed in a profuse sweat from labour or exercise. If any chill or sensation of coldness is experienced after their employment, they must be abandoned, and tepid water substituted, which, to the unacclimated visitor and others, would on the whole be found far preferable. Alluvial and muddy water from creeks, rivers, lagoons, and the embouchures of streams, or in the immediate vicinity of the coast, should never be resorted to for abluent purposes, if a purer or better quality can be elsewhere obtained. Filtration would remove, to a certain extent, the impurities that abound in fresh water. The surface of the skin immediately after every bath, should be thoroughly dried by friction from a course towel, if no prickly heat or other cutaneous irritation exist. When, therefore, the body or clothes have been thoroughly wet and saturated, either from accidental circumstances, from immersions, or long continued exposure to heavy rains, the garments should be first removed without delay, and the skin be well rubbed with strong spirits (rum, Schiedam, or aquadente, would answer), until a sensation of warmth and dryness be induced. Dry clothes may then be assumed.

3. Undue exposure to the sun should be always avoided; and great care is equally necessary not to create excessive fatigue, if so exposed. The solar temperature attains its maximum from 12^{h} to 5^{h}; all physical exertions or occupations should therefore be considerably restricted within these hours. Rest from all kinds of labour during mid-day will be attended by invigorating results. Business or pleasure avocations for

any distance should be deferred until the cooler hours near sunrise or sunset. Whensoever imperative duties demand noon-day visits from ship to shore, or from house to house, a cotton or silk umbrella must be employed to shield the head and eyes from the oppressive glare and heat that ordinarily prevails. From 5^{h} 30^{m} to 6^{h} a.m. are the hours best adapted for rising. Previous, however to the commencement of the toils of the day, a cup of coffee, tea, or chocolate, should be swallowed, in conjunction with a small piece of bread or biscuit. The intervals least unfavourable for travelling, shooting, or scientific excursions, visits, or general recreations, are from 6^{h} to 9^{h} a.m., and from 4^{h} to 7^{h} p.m., the coolest portions of the day. The time for repose varies from 9^{h} to 11^{h} p.m., or according to the previous habits or inclinations of each individual. Moderate horse exercise is preferable to walking, whenever attainable. The propriety of issuing stringent regulations for the prohibition of all persons sleeping without proper shelter, and thereby being exposed to the heavy night dews, and cold baneful land winds, however pleasant and refreshing they may be, cannot be too forcibly inculcated; for the surface of the skin, relaxed by constant exudations of moisture, is in that languid condition which renders it more susceptible to the predisposing morbific influences, and dysenteries or febrile affections sooner or later inevitably follow. Reclining on the damp ground after protracted exercise, or sleeping in apartments on shore with open windows, permeated by irregular currents of air, either from inland or evening sea breezes, or in houses in close proximity to swampy localities or the banks of rivers, must, whenever practicable, be avoided. The more elevated the quarters are from the ground the greater will be the degree of salubrity, and the less danger will occur by prejudicial exhalations from decomposed vegetable matter, or other refuse of the soil.

1. The acclimatization of European constitutions to the exigencies and vicissitudes of a tropical clime, principally depends on a partial change or adaptation of diet. That the permanency of good health is directly influenced by a normal state of the digestive organs, there can be no question; and the golden rule must therefore be, to use that kind of food best calculated to afford due support to the body, without inducing subsequent exhaustion or debility, by impairing their functions or increasing their activity. The means hitherto discovered most efficient for the accomplishment of this object, have been derived from the experience of aboriginal authorities. The habits and customs of the native tribes will frequently be found, in these respects, a tolerably safe guide; proper allowance being made for the moral and physical distinctions of race, previous mode of living, &c. It must ever be borne in mind, that in hot countries comparatively less food is required than in cold ones; and that the stomach, after irregular intervals, loses much of its assimilative powers; and although no precise system of dietetics can be enunciated that would conclusively embrace the comprehensive details of this subject, yet an ordinary maxim may be thus elicited, viz., that edibles most nutritious and wholesome, the indigenous products of the place, ascertained to be commonly in vogue, and prepared by the simple processes of native cookery, should, more or less, enter into the composition of the chief daily meals, the number of which must be regulated in accordance with the necessities of climate and constitution. Animal substances should invariably be well cooked; boiled meat, in the form of soups and stews, is therefore preferable to the same when roasted. More of vegetable, and less of the animal constituents, should be the fundamental principle in the disposition of meals. In tropical Africa, rice, yams, sweet potatoes, kous-kous, cocos, and young cassada roots, constitute excellent substitutes for European vegetables. The oleaginous and other dishes of the natives, composed mostly of mutton, fowls, game, fresh and dried fish, with palm oil, ochros, peppers, yams, melochias,* plantains, and other esculents, are very palatable and nourishing, and appear well adapted for European use, if visitors could only be induced to tolerate their somewhat nauseating aspect. Poultry is usually cheap and plentiful; and no better article of food could be purchased. Fish of various kinds, both dried and cured, with shrimps, crawfish, mangrove oysters, &c., can sometimes be obtained in large quantities; when fresh, they are in general of good flavour, and easy of digestion. Oranges, pineapples, guavas, melons, limes, bananas, mangoes, papaws, soursops, custard apples, and other fruits, if immoderately eaten, tend to promote indigestion and diarrhœa, with other irritations of the bowels, and occasionally lead to more serious disease.

When desirable, a limited allowance should be taken early in the morning, previous to breakfast. Punctuality in meals, with a certain amount of rest after each, ought so far as is convenient to be adopted, in order to facilitate the digestive process.

The judicious use of wine and spirits may be advocated, since they are not detrimental to health, and their daily enjoyment often materially contributes to the alleviation of that climatic languor and debility, resulting from an elevated temperature. Good sherry, madeira, and bucellas may be administered with advantage to invalids and others, and a few glasses at meal times is productive of an appropriate stimulus to the stomach. Port wine is commonly too much adulterated by spirituous compounds, and other noxious ingredients, to be of benefit. Weak brandy and water may be drank in moderation, throughout the day, by those more habituated to the use of ardent spirits, and will in some degree mitigate the continual state of thirst. Claret (Bordeaux wine) and water is also a pleasant and cooling beverage to persons inclined for weaker potations, and not predisposed to visceral relaxations, dysenteric, and other gastro-enteritic maladies. Abstinence from aquadente and other sorts of inferior rum and spirits cannot be too strictly enjoined, as they not only disorder the digestive organs, but exert an injurious effect on the system. Malt liquors should likewise be drank with some caution, as they tend to produce a bilious and plethoric habit of body, and ultimately dispose to apoplectic and congestive diseases. Allsopp's or Bass's pale ale is, on the whole, more preferable to bottled porter, stout, or the stronger ales, as they are manufactured of greater purity, are a milder stimulant, and less subject to unwholesome adulteration. Occasionally, they have been known to exert a remarkably tonic influence on the worn out and debilitated constitutions, of the older colonists and traders. The moderate indulgence of the passions is not prejudicial to health; but great care is requisite that their gratification becomes not habitual, so as to degenerate into excess, which is too frequently the case with residents, in tropical countries.

5. Among the predisposing causes of sickness, one of the most frequent is the dread and prostration of spirits that pervades almost every class of people on their first visit to this unhealthy coast. The unremitting fatality of the diseases, united with the depressing influences of climate, have certainly gained for this part of the globe, an unenviable notoriety, which time can never dissipate. Notwithstanding the array of fearful drawbacks, individuals may reside in the majority of these regions, unimpaired in health or constitution, for a considerable number of years, by proper care and attention to hygienic considerations, by cheerfulness and confidence relative to future results, regularity and a tropical adaptation of diet, by a determination to resist hypochondriacal forebodings, or despondent impressions, by the appropriate employment of time in judicious mental and physical labour or recreations, and by tranquillity of mind and an implicit reliance on the ever constant protection of an all-wise Providence. By a conformity to these hints, I have known many Europeans live in some of the most sickly countries of Western Africa, for periods of twenty and thirty years, and even upwards.

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